October 1980

Smithsonian

Modern dancers follow trail of the art's pioneers (p.60); here, a *Scarf Dance* re-created

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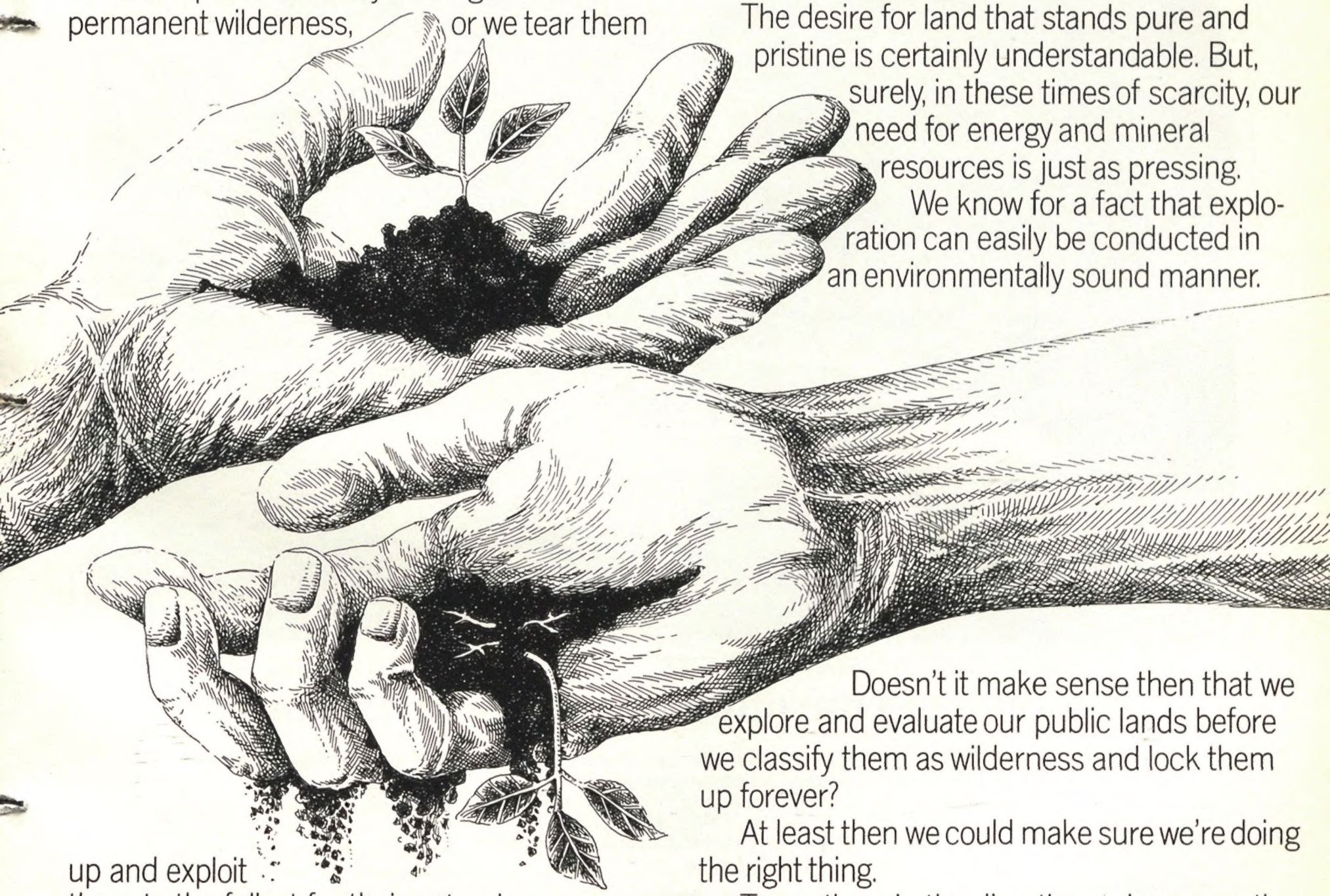
Some want to keep our land unspoiled. Some want to explore it. We want to explore without spoiling.

There's a strange either-or proposition building up in this country.

It's one that says either we completely preserve our public lands by turning them into permanent wilderness, or we tear them up and exploit them to the fullest for their natural resources.



We've got to believe there's an acceptable middle ground between these two extremes.

Because neither is really in the long-range interest of our country.

Look at the facts. Our public lands currently supply only 10% of our energy. Yet they actually contain about half of all our known domestic energy resources—vast amounts of coal, oil shale, tar sands, crude oil and natural gas.

And what are we doing about it?

In recent years, through legislation or administrative action, 130 million acres of the 760 million that the federal government owns have been completely withdrawn from exploration of any kind.

And there's more legislation pending which, if passed, will mean that, in total, as much as 71% of our public land could be set aside.

All without ever finding out first, through preliminary exploration, what the resource potential of that land really is.

The desire for land that stands pure and pristine is certainly understandable. But, surely, in these times of scarcity, our need for energy and mineral resources is just as pressing.

We know for a fact that exploration can easily be conducted in an environmentally sound manner.

Doesn't it make sense then that we explore and evaluate our public lands before we classify them as wilderness and lock them up forever?

At least then we could make sure we're doing the right thing.

To continue in the direction we're presently going could well be one of the most self-defeating steps we've taken in this century.

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October 1980

Smithsonian

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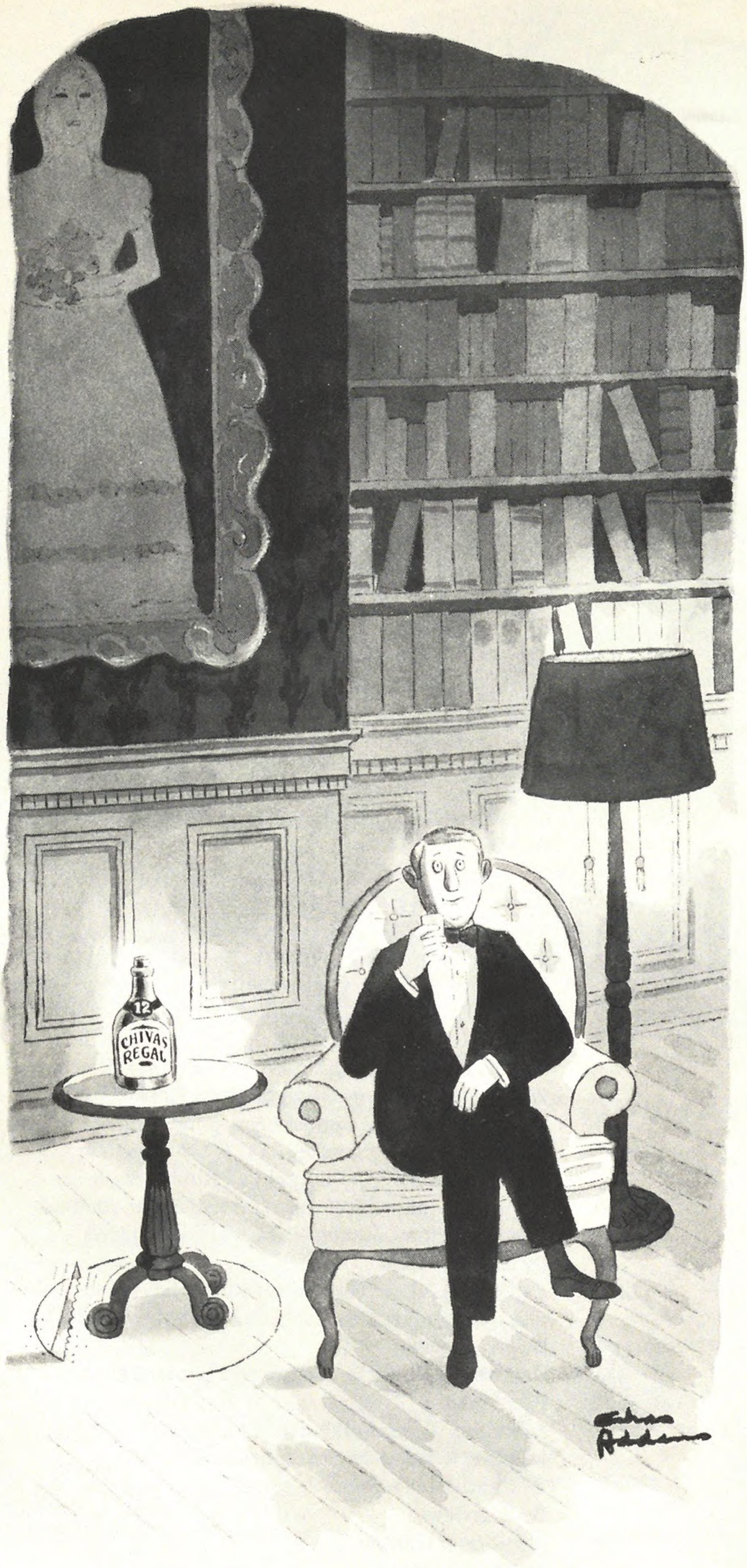

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Secretary Ripley's comments

The view from the castle

Although molecular and cellular biology are glamor fields today, patient work among museum collections still pays dividends

In this issue there is an article (p. 99) about Roger Tory Peterson's new *Field Guide,* an epochal publishing event to millions of bird lovers. A pioneer and the most successful innovator in concisely describing how to identify a bird in the field, Peterson has made birds popular as never before, and has helped lift conservation into the status of a household word. Small wonder that he recently was awarded the President's Medal of Freedom, as someone who has rendered a signal service to America.

All this started in a museum as well as in the field. I can well remember my own student days in New York, frequenting the bird department of the American Museum of Natural History, sitting at the feet of the then giants of ornithology who formed the staff. Peterson and another great field guide author, Richard Pough, would come in to study and to draw specimens, preparing texts for an unknown bird public somewhere "out there."

As one who started as a field zoologist in museum work and who taught and worked for years in a museum at Yale, I have never really left my chosen research. One of my chief interests in coming to the Smithsonian in 1964 was to continue as a museum man who could feel at home with colleagues in curatorial departments, and who could follow in a tradition of research.

In recent years studies in biology have moved closer to the microscope. The fields of molecular and cellular biology are now crowded with students and aspirants at every age level. Meanwhile the new concern for the environment has produced a new and ardent breed of ecologists.

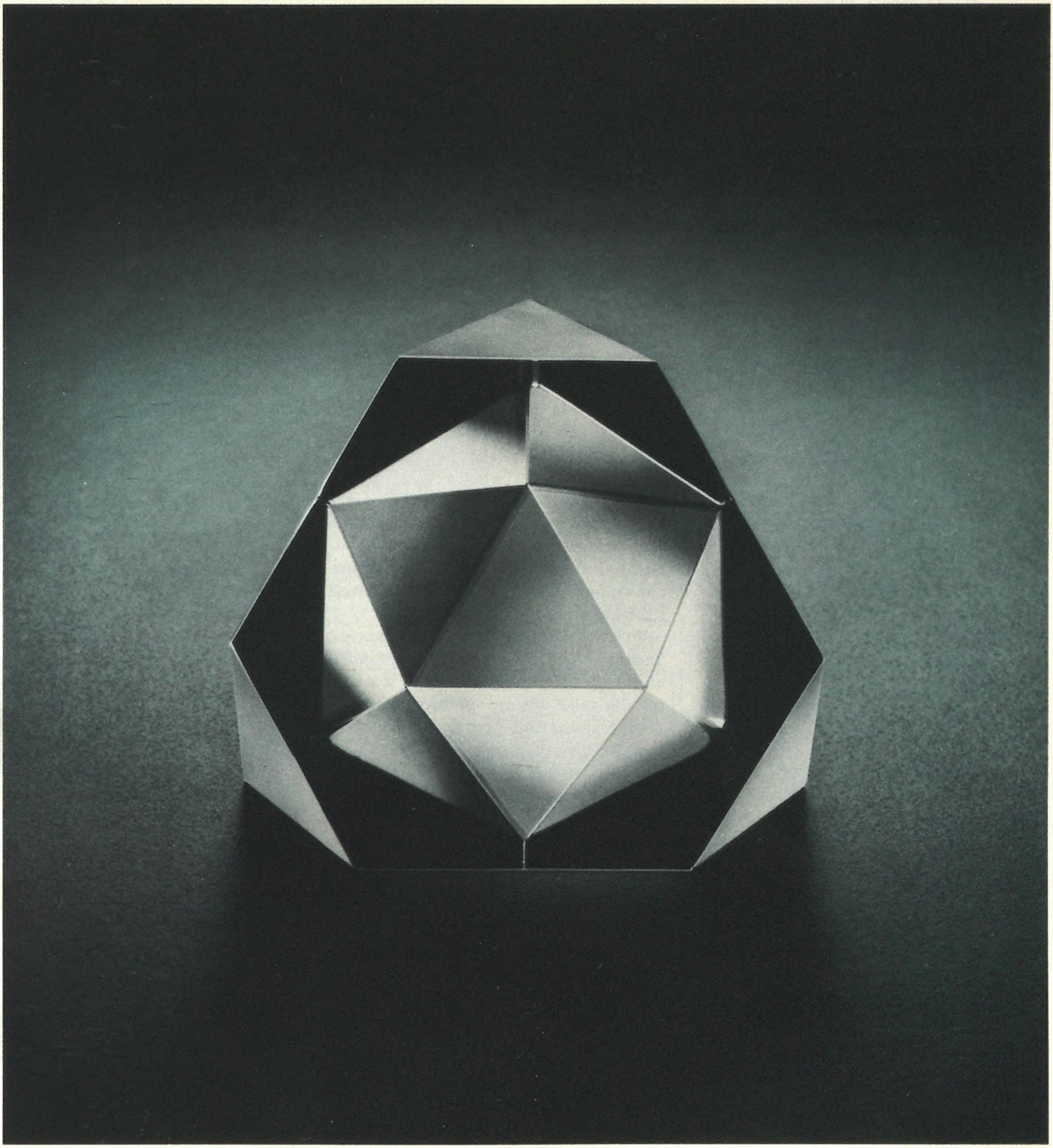
Paradoxically there has been a relative decline in traditional fieldwork and museum studies of collections, on which so much of the information for layman and professional alike is based. Recently, in a critique of the status and recent history of American ornithology, two young biologists made the statement that "so little fossil material exists and genetic studies are so difficult that, for evolutionary problems, studies of birds are not attractive."

Nevertheless, ecologists still have an immense amount to learn from the collections in museums as well as from active field studies of living birds. The data bank available is stupendous, both for those seeking the real truths of evolution embodied in the collections, and for students of the decline, slow but relentless, of our environment.

And yet, strangely, far too few people find the exacting task of museum work to their liking as a career, and too few universities recognize the vital importance of such work. The urgency is there, too, as we often testify to Congress and to other sources of power and financial support.

To me, working in the museum laboratory brings great satisfaction. At all times one is at the fringe of new dimensions of knowledge of the life around us, of the ordering of species, of recent cycles of change which affect the dynamics of bird populations. To sit on a tropical mountainside, or to recapitulate the data in a museum lab, is to become a witness to the evidence of creation, a joy indeed.

S. Dillon Ripley



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Letters to the Editor

Terns

Dear Sir: In regard to your article in the August issue on the research project at Great Gull Island, I think the scientists and volunteers there must ask themselves some questions:

To what extent do their activities influence or obscure the natural dynamics of the local bird populations? Is it scientifically valid for one volunteer to study the survival rate of a particular group of chicks while other volunteers are chasing away or killing predators? When "tern farming" begins, hasn't a natural habitat been irreparably altered? Building shelters for the chicks clearly runs counter to the scientific method.

In the "real world" Mother Nature plays hardball, and however cruel it might seem in isolated cases, the young volunteers shouldn't try to change the rules of the game.

Robert J. Lauf
Oak Ridge, Tennessee

According to project director Helen Hays, all the large tern colonies in the Long Island Sound area today are on islands created or altered by Man. It is not possible to say what the natural dynamics of the tern population might be, but it seems worthwhile to determine how the terns are coping and to make more room for them where they are reproductively successful. Ed.

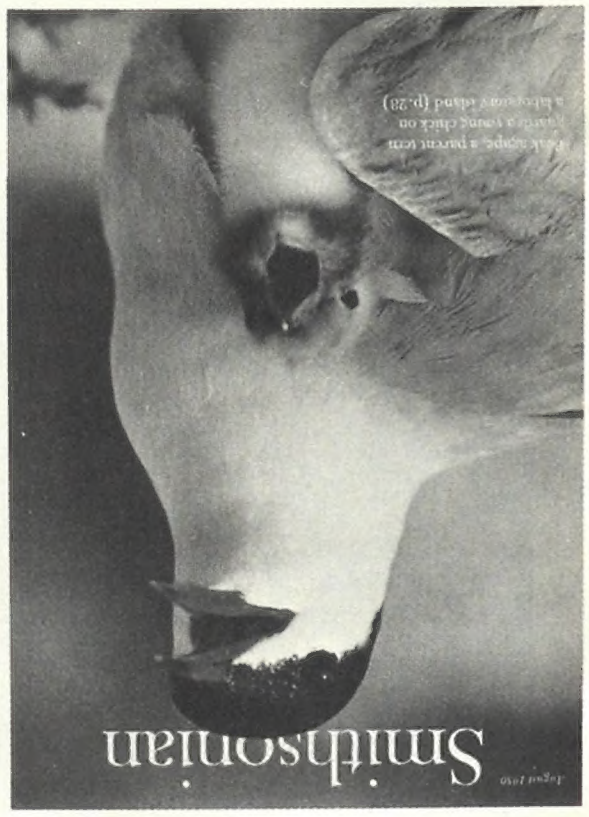
Dear Sir: If someone attempted to trap, bag and band my young or myself, I would certainly bombard them with whatever weapon I had!

Susan Ambrosio
Staten Island, New York

Dear Sir: If one looks upside down at George Silk's beautiful cover picture of terns, he will see a surrealist calf.

Anne P. Myers
Virginia Beach

Other readers who turned the cover upside down (see below) or sideways saw a Grand Canyon burro, a floppy-eared cow or a very young goat nibbling away at SMITHSONIAN. Ed.



Cancer therapy

Dear Sir: It is regrettable that your article may convey the idea cancer victims have brought the disease on themselves.

I have had cancer since 1974. I have undergone major surgery 12 times and have had numerous radiation treatments and chemotherapy. I do not believe that "psychological factors" had anything to do with my getting cancer, and neither will those factors rid me of the disease.

In the final analysis, there is still only one way out of this life, unless you are Elijah and go to heaven in a fiery chariot.

B. L. Hendrickson
Highland, California

Dear Sir: I was surprised to learn of the criticism from skilled physicians who do recognize the possibility of personality problems causing cancer, but who feel that revealing this knowledge would place an additional heavy burden of guilt on cancer victims.

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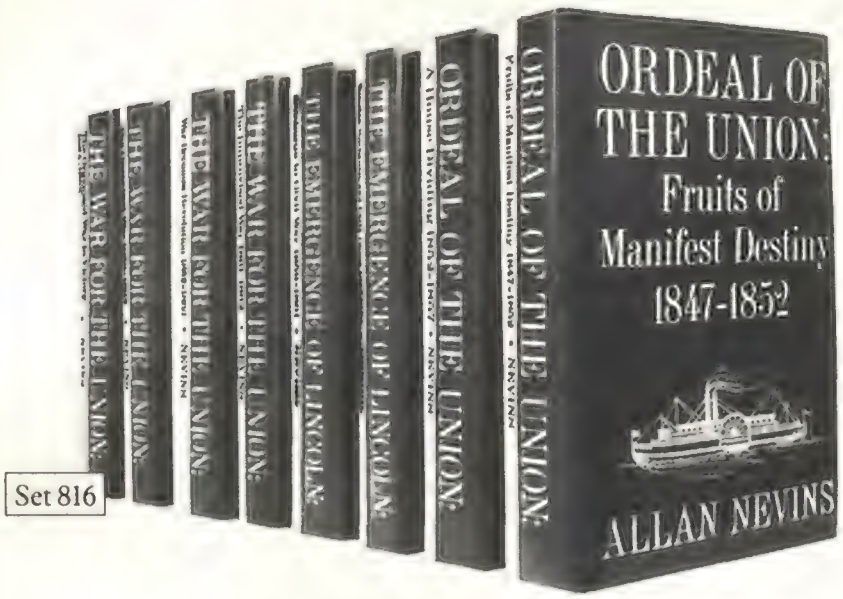

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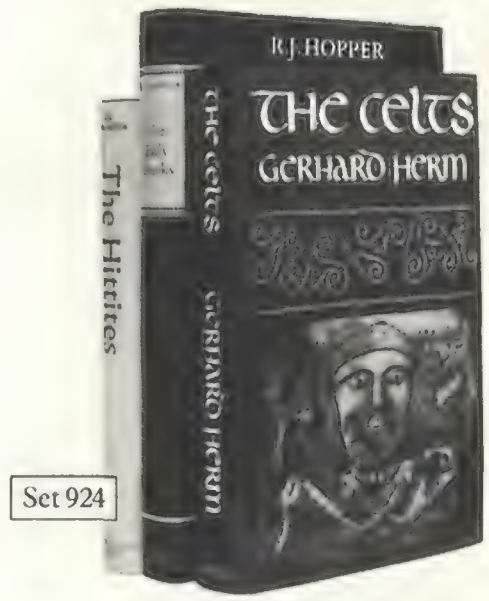

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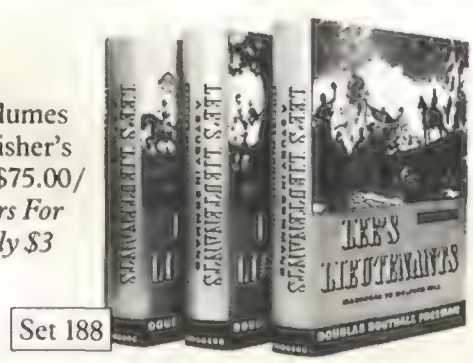

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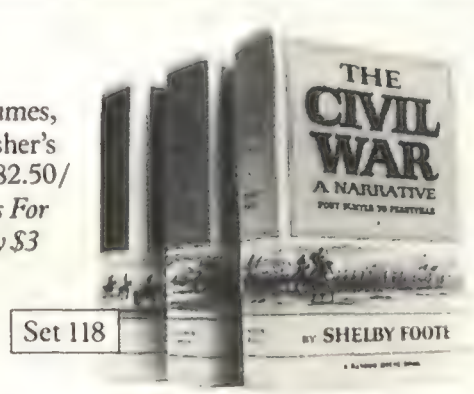

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All we need do is believe we can be, stop excusing ourselves, roll up our sleeves and get to work. I'm convinced feeling guilty is a very good sign.
Helen Solem
Hillsboro, Oregon

Dear Sir: I am a psychology professor, a cancer survivor currently in good remission and a graduate of Stephanie Matthews-Simonton's three-day crash cancer-cure course. While I think it is a wonderful, sometimes mandatory, thing for patients actively to enter into their own rehabilitation, it has to be done without buying the Simontons' routine. Immediately after my Simonton training I was all aglow with the zeal of a true believer in spite of the psychological dissonance it caused me. I was even willing to admit I developed cancer because I was so unhappy. It took my mother's death from rapid cancer to convince me of the flaws in the Simonton method. I know that she was not dying because she was so miserable and chose cancer as a socially acceptable way out. The psychotherapists who are so excited over the Simonton technique generally have not attended cancer patients on their deathbeds; you cannot come away from that level of suffering and continue to believe that cancer is a self-inflicted phenomenon.
Mrs. James F. Crane
San Antonio, Texas

Dear Sir: Psychosomatic illness has been viewed as reality for a long time. The Simontons are cognizant that psychosomatic health has the potential of that same reality. If the human mind has the power to break the body down in illness, it is more than logical to assume the mind can also cure bodily illness.
Donna Cockrell
Costa Mesa, California

Dear Sir: Since when is there such a thing as "bogus hope?" Pure blind hope and faith have been behind everything Man has ever dreamed about or accomplished. With every new idea comes a host of opposition that must be overcome to make the dream a reality. Such were probably the "bogus hopes" of the persons who were first involved with the wheel, electricity, vaccinations, hybrid plants, birth control and space travel.
M. Crisman
Omaha

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Lipton

Dear Sir: According to G. M. Trevelyan, tea began to be drunk by all classes in England in the 18th century. In his *English Social History* he states: "after the middle years of the [18th] century tea became a formidable rival to alcohol with all classes, both in the capital and in the country at large." He adds that in the reign of George III, "Tea drinking had become a national habit, a rival to the consumption of spirits and beer." In 1784 Prime Minister William Pitt the Younger calculated that 13 million pounds of tea were consumed in Britain.
Michael Fry, M.D.
Glenford, New York

Dear Sir: In the small resort town of Grand Lake, Colorado, is a very active yacht club (going back to 1902), and at 8,600 feet above sea level, it was then the world's highest. The first Commodore, William "Harry" Bryant, met Sir Thomas Lipton in the early 1900s and told him of this yacht club in the high Colorado Rockies. Lipton, impressed, sent a silver cup, still the most coveted award during Grand Lake's annual Regatta Week.
Hanes M. Dawson jr.
Granby, Colorado

Dear Sir: A.B.C. Whipple's excellent article reminded me of a story told by Peter B. Kyne in *Cappy Ricks Retires*:

"Cap'n Cliff was a Gloucester fisherman, with the smartest little schooner that ever came home from the Grand Banks with halibut up to her hatches. He couldn't read or write and he'd never learned navigation; but he'd been born with the instincts of a homing pigeon, and somehow whenever he pointed his schooner toward Gloucester he managed to arrive on schedule; and any time he got a good fair breeze from the west, like as not he'd run over to England and sell his catch. . . .

"Like most of his breed, Cap'n Cliff had to have a fast boat; he had to keep her as immaculate as a yacht in order to be happy, and he was never so happy as when he'd meet a squadron of the New York Yacht Club out on a cruise and sail circles round the flagship with his little old knockabout fish schooner. On such occasions old Cap'n Cliff would break out a long red burgee with M.O.B.Y.C. in white letters on it. On one of his trips to

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England he hooked up with a big schooner wearing the ensign of the Royal Yacht Club and dassed 'em to race . . . .

"Well, sir, it happened that the late King Edward was aboard his yacht that day and you know what a sport he was in his palmy days. Cap'n Cliff cracked on everything he had in the way of plain sail, and, after holding the King even for a couple of hours, he put his packet under gaff topsails and fisherman's staysail, and broke out the balloon jib, bade Edward good-bye in the International Code—and flew! About six hours after Cap'n Cliff came to anchor, the King loafed up in his yacht, dropped anchor, . . . and came over to visit Cap'n Cliff . . . .

" 'My dear sir,' says Edward, pointing aloft to the red burgee with M.O.B.Y.C. . . . ' to what yacht club do you belong?'

" 'My own bloomin' yacht club, your majesty,' says Cap'n Cliff. . . ."

Thomas H. Henning
Chicago Heights, Illinois

British train buffs

Dear Sir: Ann Wood's article on England's steam railroads gave American rail fans short shrift. There are in the United States thousands of active buffs and collectors of railroad memorabilia, including everything from timetables and tickets to dining-car china and brass locomotive bells. In addition there are some 140 railroad and trolley museums.

Seth H. Bramson
Miami Beach

Whitney Museum

Dear Sir: Regarding your statement that the Whitney was the first museum devoted exclusively to American art, I would like to point out that it was preceded by The New Britain Museum of American Art, founded in 1903, and The Butler Institute of American Art, 1919. The latter's founder, Joseph Green Butler jr., was my grandfather and the original collection consisted of 80 paintings, almost entirely American works.

Joseph G. Butler III, Director
The Butler Institute of American Art
Youngstown, Ohio

View from the castle

Dear Sir: Here is an entirely different "view from the castle," which appeared

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in Bil Keane's "Family Circus" cartoon in the *Milwaukee Journal* [see below].
Thomas Gaertner
Milwaukee, Wisconsin

"Did the Smif'sonian people get the idea for that castle from Disneyland?"

Toy soldiers

Dear Sir: As a longtime collector of the old toy soldiers, I like to see the hobby recognized as something more than a refuge for people reliving their childhood. The Sixties were not the end of the toy soldier industry; it is thriving today, with most of the manufacturers in England and Wales but at least four in the United States. These are not cheap plastic, but lead-tin, hand-painted soldiers. They are not the collector's model soldiers but slightly crude.

A couple of thousand toy soldiers parade around the shelves in my den, 90 percent of them made since 1974.
William C. Driscoll
Fairfax, Virginia

Marginal farm

Dear Sir: I read Wendell Berry's article with nostalgia. I grew up on 180 acres of what might be described as marginal farmland in central Illinois. My father, who maintained an architectural practice as well as the land and some Angus cattle, tried to retire, about five years ago, in California. However, he too found the difference between cherishing a place and living in it to be enormous, and he returned with my mother.

In order to preserve the hilly timberland, my parents recently donated a 92-acre parcel to the Fond du Lac park dis-

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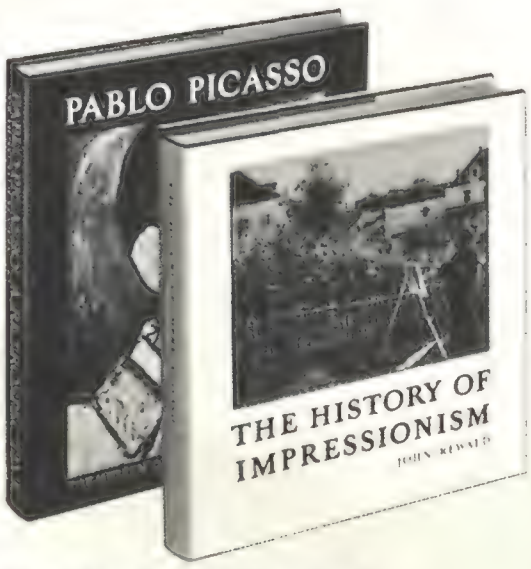

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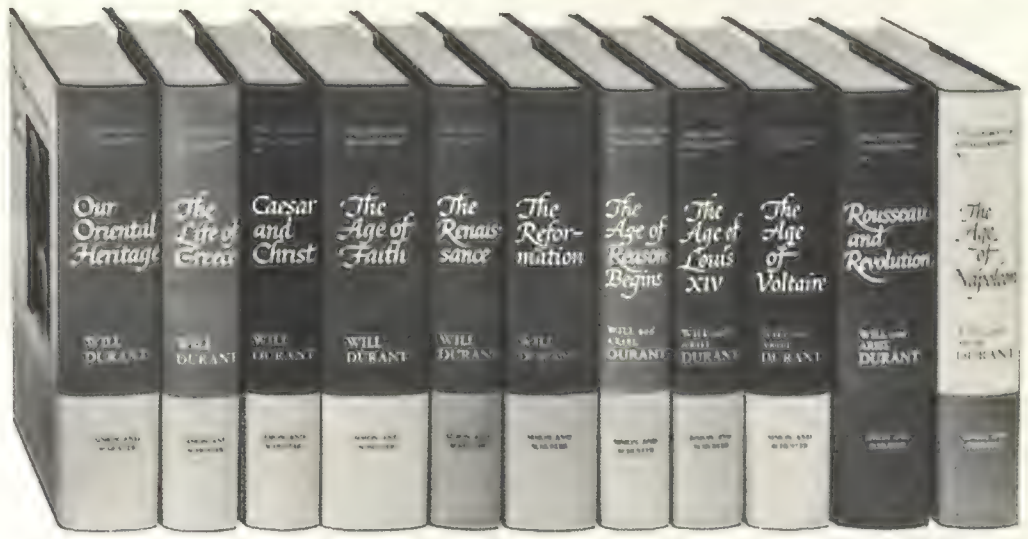

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trict. They tend the remaining land, cut their own firewood and tell my sons fine stories about the deer and birds who are their grateful neighbors.
Morgan Hewitt
Stockton, California

Supermarkets

Dear Sir: Is there a catalog for the History and Technology supermarket exhibit?
Helene Klein
St. Petersburg, Florida
There is no catalog, but a source we used is Supermarkets, 50 Years of Progress *by Randolph McAusland, available from the Food Marketing Institute, 1750 K Street NW, Washington, D.C. 20006.* Ed.

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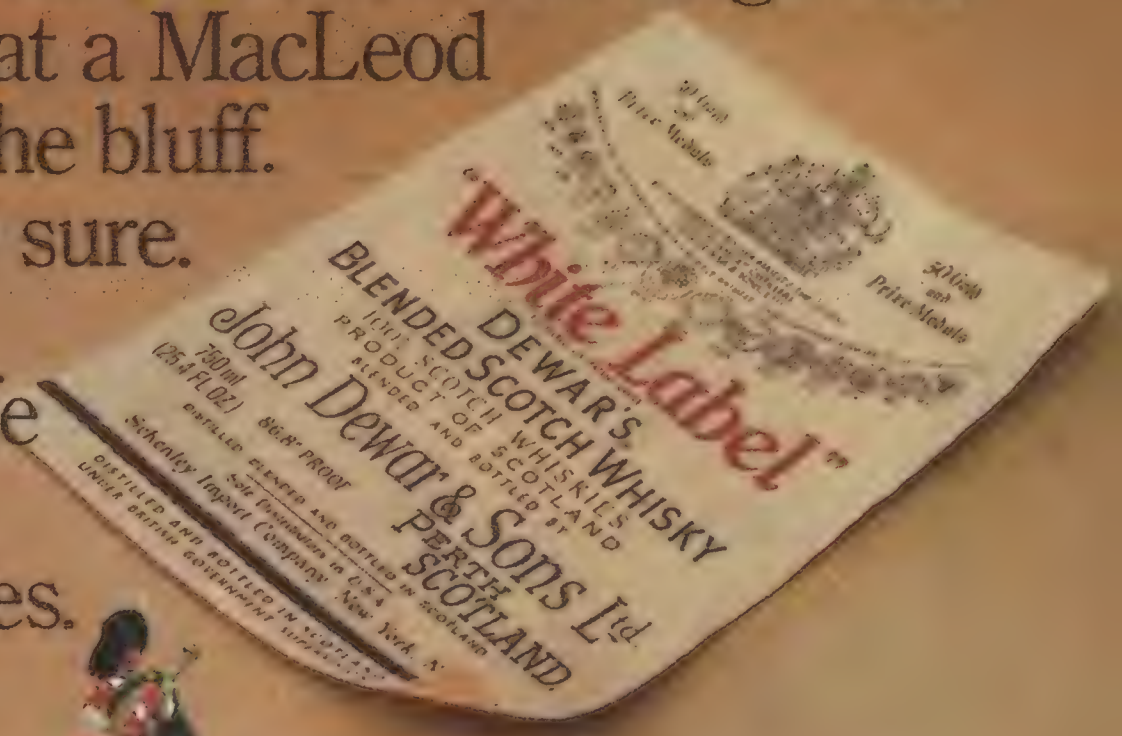

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Smithsonian highlights

October is a month of openings—Alfred Eisenstaedt, Benjamin West, a coral reef, silver, Japanese screens, Oregon folks and Nevada cowboys. The mix will be just as great on the Washington Monument grounds October 8-13 at the 14th annual Festival of American Folklife, which features, among other attractions, Caribbean calypso, Asian weavers and carnival pitchmen. Sponsored by the Smithsonian Institution and the National Park Service, the festival is always good for music, food and the tidbits of everyday life and work around the country.

Special October events

National Collection of Fine Arts
Eisenstaedt: Germany (October 31-January 4)—Eisenstaedt, who emigrated here in the 1930s, contrasts photos of those days (below) with photos taken on visits to Germany in 1979 and 1980.
The World of David Gilmour Blythe: 1815-1865 (October 17-January 11)—Art works by this social satirist.

Cooper-Hewitt Museum (New York)
The Cooper-Hewitt Collection (October 28-February 1)—Some 80 silver objects.
Electroworks (through November 2)—Creations on office machines (pp. 26-27).

Freer Gallery of Art
Rimpa Screens (opens October 10)—Japanese decorative screens.
Ancient Chinese Jade—New exhibit features objects nearly 5,000 years old.

Marlene Dietrich, sporting fancy cigarette holder, actress Anna May Wong and director Leni Riefenstahl posed for Eisenstaedt at Berlin costume ball, 1928.

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Museum of African Art
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Museum of Natural History
Coral Reef (opens October 15)—Spectacular living coral reef community within 2,500-gallon reef and lagoon tanks.
Flora of Louisiana (ends November 23).
Illustrated Lectures—"Mt. St. Helens: Eruption and Update" (SMITHSONIAN, July 1980), October 3, noon; "Collecting Bromeliads in Brazil," October 10, noon.
The Christians—Free film series on Fridays at noon, beginning October 17.

Museum of History and Technology
Buckaroos in Paradise: Cowboy Life in Northern Nevada (October 1-March 16)—Transported bunkhouse, tools, photos and film portray a very special life-style.
Ceramics as Historic Evidence (through December)—Shows dating techniques.
The Making of the President 1960, 1964, 1968, 1972 (Wednesdays, Thursdays, 12:30 P.M.)—Free films.

Air and Space Museum
Boyington and the Black Sheep (October 6, 7:30 P.M.)—World War II memories.
The Space Mural (October 15, 7:30 P.M.)—Robert McCall discusses his mural.
The Star Machine (October 4, 9 A.M.)—Monthly sky lecture.
Feature Films (Thursdays, 7:30 P.M.).

Portrait Gallery
Ruth St. Denis (October 25, 1:30, 2:30 P.M.)—Portraits in Motion series presents interpretation by Repertory Dance Theatre of Utah (pp. 60-69), free.
Benjamin West and his American Students (October 17-January 14)—A definitive study of "the father of American art."
Unsuccessful Candidates for the Presidency: 1912-1976 (through November 9).

Renwick Gallery
Webfoots and Bunchgrassers: Folk Art of the Oregon Country (October 3-February 1)—Saddles, quilts, Ukrainian eggs.
Berlin Porcelain (through November 23).

National Zoo
Great Ape House (opens October 1)—Building for gorillas and orangutans has floor-to-ceiling climbing structures, outdoor exhibit area.

Smithsonian events

For tickets to October resident associate events, call 357-3030:
Life in the English Country House (October 22, 8 P.M.)—Talk by David N. Durant.
Turkish Painting (October 27, 8 P.M.).
Mt. St. Helens, Plate Tectonics, Continental Drift (October 18)—All-day seminar.

HOW TO BUILD A BOEING.

Boeing is now building an airplane that'll save millions of gallons of fuel: the new generation 757.

How much will it save?

A 757 flying 1.3 million miles a year will save 1.8 million gallons of fuel annually over the airplane it will replace.

Fuel economy has always been a concern to an airplane designer. Now it's more critical than ever.

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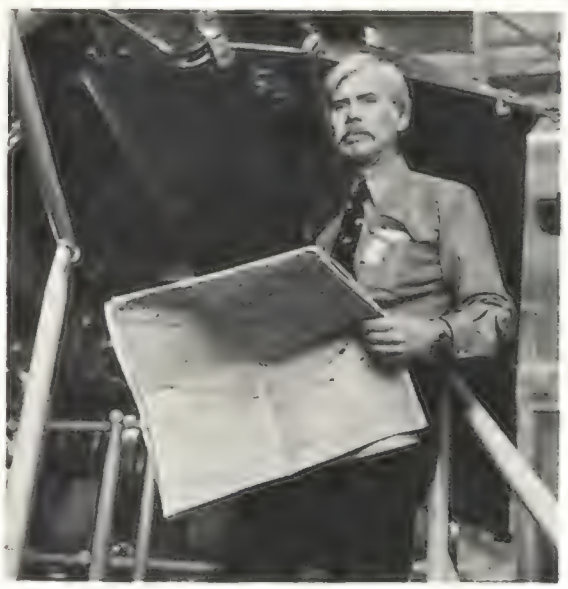
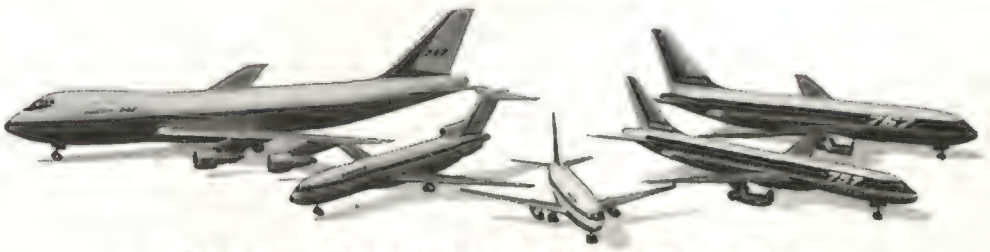


would never have been possible if Boeing had not been testing and perfecting components of lightweight carbon-fiber and high-strength pure aluminum alloys.

Result: The 757 wing will get the airplane off the ground and flying with less fuel consumption than any airplane its size.

New aerodynamics, new materials, and engineering inventiveness along with a long-term commitment to constantly reach out and explore the unknown have made the 757 a reality.

Boeing believes almost anything is possible. Doug and the team are but one part of the immensely complex process that has helped create a future world of efficient commercial aviation — a step that can keep air travel one of the best values in the world of rising inflation.



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Cities in China (October 21, 28, November 4)—Film series.
Early Modern Dance: Revival and Survival (October 26)—Seminar, performance.

For tickets to performing arts events, call 357-1500:
Underground Railway (October 2-November 2)—Children's play, A&I Discovery Theater, Wednesdays-Sundays.
Modern Dance in America: The Early Years (October 27)—Re-creation by the Repertory Dance Theatre of Utah.
Marion Williams Concert (October 12).
Bobby Bare Concert (October 19).
Kuchipudi (October 26)—Indian dance.

Membership benefits when visiting the Smithsonian

Associates Reception Desk: Information and special publication, 10 A.M.-4 P.M. daily in the castle. Ask about orientation slide talk on 13 Smithsonian museums.
Associates Lounge: Quiet relaxation, 10 A.M.-5:30 P.M. daily in the castle.
The Court: Members' dining room, in the Museum of Natural History.
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For previsit information: Send postcard or phone Associates Reception Center, Smithsonian Institution, Washington, D.C. 20560 (202-357-2700 or, for hearing impaired, TDD 202-357-1729). Allow two weeks for receipt.

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SITES circulates exhibitions to hundreds of cities outside Washington, D.C. To sponsor a show in your community, write to Eileen Harakal, SITES, Smithsonian Institution, Washington, D.C. 20560. Here are some October exhibits:
Tucson (October 25-November 23)—*Architecture and Planning*, University of Arizona Museum of Art.
Storrs, Connecticut (October 18-November 16)—*Pochoir*, Connecticut University.
Boston (October 4-November 2)—*Designs of the Ndebele*, National Center of Afro-American Artists; (October 1-December 31)—*Ice Age Art*, Boston Museum of Science.
Lincoln, Nebraska (October 18-November 16)—*Art as Language*, University of Nebraska.
Cincinnati (October 18-January 4)—*Jupiter and its Moons*, Cincinnati Museum of Natural History and Planetarium.
Dallas (October 25-November 23) *Faralon Islands*, Natural History Museum.
Pullman, Washington (October 20-November 30)—*Contemporary American Potters*, Washington State University.

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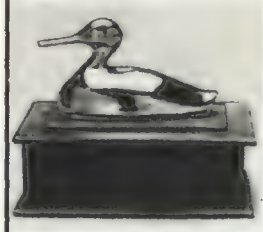

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"I made it despite myself."

Success Forces

Can you be successful despite yourself? Here's how I did it.

By Joseph Sugarman, President
JS&A Group, Inc.

It's a joke. I'm considered one of America's top copywriters and mail order entrepreneurs.

I never finished college, never took a course in business, advertising or creative writing, and even flunked English.

On top of that, I failed at almost everything I did. My list of failures would fill an encyclopedia.

Now you probably expect me to tell you that it was failure after failure until I hit upon the "wealth formula" or the "secret to success" or some other trite expression. Not true.

ONLY SIX REASONS

What I've found about success is quite opposite the formulas you've read about or the misconceptions you've heard.

I simply took my few successes and many failures and discovered six reasons why I failed and six reasons why I succeeded.

The reasons I succeeded seemed like forces. Whenever I followed them, I achieved success. Whenever I didn't follow them, I failed. I soon called them Success Forces.

I used Success Forces to build my business from the basement of my home into America's largest single source of space-age products. I was successful. But was it a coincidence or was it a direct result of Success Forces? I really didn't know.

MATERIAL THINGS

If you measure success by material things, I achieved quite a bit: several cars, airplanes, snowmobiles, motorcycles, four beautiful homes—all the material things I imagined I'd ever want.

And I had recognition. My success story was written up in several magazines. But it wasn't until after I revealed my Success Forces in a few speeches that I realized my concept would work for others.

I was getting letters from people who told me how one of my Success Forces had changed their lives. Others told me of how they used Success Forces to make extra money or achieve greater happiness. Still others who always thought of themselves as failures, became successful despite themselves.

But the whole thing seemed strange to me. Was Success Forces original? Something like it had to be in some other success book. So I read. I bought every success book I could find. I studied Chinese philosophy. I bought every motivational cassette that was offered. And I thoroughly studied the material.

I then discovered why my concept was indeed different. Success Forces lets you be yourself, and guides you towards making simple choices that can ultimately change your life. If you make the right choices, you are literally forced into success.

MY $2,000 SEMINAR

Although I was convinced that my concept was different, I wanted to be absolutely sure it would work. I decided to conduct a seminar with a select group of 16 people who would be willing to pay handsomely to learn my philosophies. My five-day seminar cost each participant $2,000 and I held eight of them. All were sold out.

The success stories resulting from each seminar are already history. I taught a Texas farmer, a New Zealand rug merchant, a lady from Australia. There were people from all walks of American life, many of whom paid their last $2,000 to attend.

Not all of the participants succeeded. But so many did become successful and so many told me later how I literally changed their lives, that I was convinced Success Forces should be available for everybody to use.

NOW AVAILABLE

I am now making my concept available in a hardbound book entitled "Success Forces." It contains examples from my speeches and the philosophies from my seminar that participants paid $2,000 to hear.

A few of the Success Forces you may already know and have been subconsciously following for years. Others, you may have been fighting, thinking that you would fail when all along you would have succeeded. A few of my Success Forces require action—the type of action that everybody can take and that requires no special skill.

This is not a step-by-step book on how to get into a business that promises "A Lazy Way to Riches," or a way to "Quit Your Present Job." It does not matter if you are in business nor whether you want to work hard, take it easy, or just plain be successful.

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There's a saying: "You can feed a man a fish and he'll eat for a day. But teach a man to fish and he'll eat for a lifetime." My book will help you for a lifetime.

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Press the button—and out comes art

Brilliantly colored spray-painted eggs. Softly muted hues of pressed nasturtium leaves. A whisk broom wearing a satin ribbon. Pliers rampant on a bed of color.

These and other mostly mundane objects, transformed into handsome, playful, witty and sometimes surreal pictures through the medium of office copying machines, can be seen in *Electroworks* at the Cooper-Hewitt Museum, New York, through November 2.

The exhibition of nearly 300 such esthetic concepts was assembled by Marilyn McCray, guest curator of 20th-century Photography at George Eastman House, Rochester, New York, and will travel to Nashville, Philadelphia and Mexico City.

For 20 years many painters, printmakers, photographers and designers have found black-and-white office copiers irresistible. Variations on the theme of *plunk-it-on-the-glass, punch-the-button* seemed limited only by the artists' own creativity. Still, 3M salesmen in Chicago in 1969 were stunned when Sonia Landy Sheridan hauled out her lunch—a peanut butter sandwich—and made a print of it on their new Color-in-Color machine. The color copier as an artist's tool was on its way, and since then Mrs. Sheridan has produced such dreamlike pictures as *Flowers* (lower right).

Most artists use the Xerox 6500 Color Copier, although some prize the 3M for its luminous colors and softened outlines. or the old black-and-white Haloid Xerox which, with a camera mounted on runners, "combines the flexibility of a view camera with the quality of a drawing," says artist Joan Lyons.

Her self-portrait (top right) is "a lithographic Xerox transfer reinforced with drawing directly on the plate." The delicate leaf image next to it was transferred to paper, touched up with color and duplicated to create a multiple image.

Printmaker Erin Goodwin likes the effect of flat frontal light on the simple compositions of her Magician Series (lower left). To Connie Fox (center left), the shallow depth of field "gives an exaggerated sense of space." Painter Peter Astrom (top center) works over his prints with brush strokes after transferring them to artist's paper. Printing a photographic image on shiny fabric (bottom, center) gave Betty Hahn the effect of a daguerreotype.

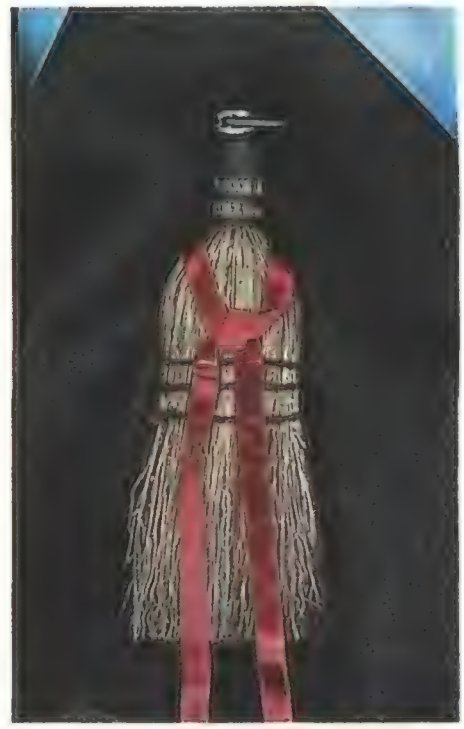
And now—troop on over to Cooper-Hewitt. Each visitor may make one work of art on the copier.

—Jane D. Scholl

Barbara Astman, *Untitled,* 1977

Peter Astrom, *Bent Flowers,* 1979

Connie Fox, *Pliers,* 1978



Connie Fox, *Whisk Broom,* 1978

Erin Goodwin, *Magician Series: Special Eggs,* 1977

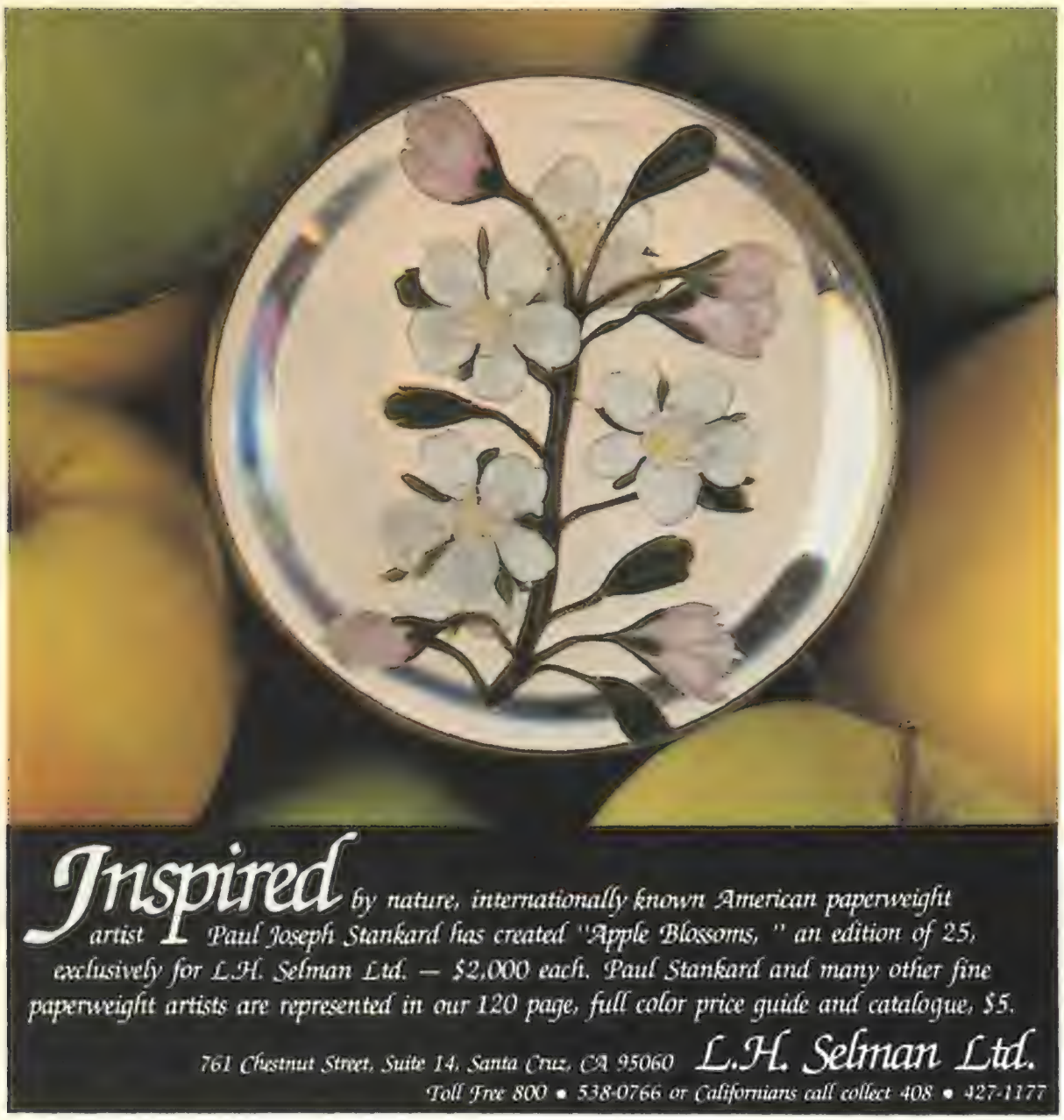
Joan Lyons, *Untitled,* 1974

Joan Lyons, *Untitled,* 1978

Bruno Munari, *Original Xerograph,* 1977

Sonia Landy Sheridan, *Flowers,* 1976

Betty Hahn, *Soft Daguerreotype,* 1973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Around the Mall and beyond

About a year ago the little Smithsonian publication called *Art to Zoo*, aimed at youngsters, ran an article about cameras and included a photograph of a tiny camera hidden in the heel of a shoe. Such devices, said the article, allowed spies to snap pictures of secret documents and newspapers to break stories on various clandestine goings-on. Fascinating.

Having been a journalist for an unconscionable number of years, I had never, I had to admit to Ann Bay, Editor of *Art to Zoo*, been on an assignment with a photographer who used his equipment so cunningly. The guys from the photo department with whom I worked carried their stuff around quite openly—often with considerable help from me. I was young and husky and rather new, at first one paper and then another, and when a new writer went on an assignment he always, I was told, helped carry the camera gear. It was a newspaper tradition. And I believed those old-time photographers implicitly.

Far from doing anything undercover like sneaking photographs of some forbidden subject with a shoe-heel camera, my colleagues were the kind that would shout out such embarrassments as "Hey, King! Move over, willya?"

The shoe-heel camera, however, existed all right, because it's been in our photography exhibit at the Museum of History and Technology. And it inspired Ann Bay to kick off a competition among her young readers called "Design Your Own Detective Camera."

Sketches flooded in—a camera hidden inside a cigar and activated when you tap off the ash, a camera in a comb, a camera (*really* tiny) peeping through one of the

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Pick a tooth and take a picture.

holes in a Band-Aid, a camera set inside the "O" of the Holy Bible, a camera in the zipper on your blue jeans that would work, said its young inventor, when you zipped up your fly.

We publish herewith one of our favorite suggestions, "The Filling Camera." It's triggered when you go after an elusive raspberry seed with a toothpick and touch the exact spot on your premolar. Timothy Richard Houge of Manson, Iowa, submitted this drawing that the CIA may want to copy.

A similar tooth camera came from Jeremy Herman of Underhill, Vermont. This one was designed to be set off by pressing your tongue against a "presure senteve button" on the inside of the tooth. This snapped the "camfloshed lence." Jeremy is obviously going to be a news photographer. He already spells like one.

Ordinarily the future perfect tense should be shunned by writers and treated with suspicion by readers. To say that such-and-such "will have happened" is flashing too much hubris past the gods for them to ignore. "Oh, yeah?" say the gods —who, I am sure, still use such dear old-fashioned forms of repartee—and *zap*, such-and-such never does happen.

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But when a writer is panting after a deadline in August to describe for an October issue an event that is scheduled for September, how else can he handle it? If he takes a deep breath, squares his shoulders, sticks out his jaw and says "it happened," he's producing even more hubris and asking for an even more severe zapping. To say "it might happen" is a gutless cop-out. To say "it will have happened" at least places him, honestly, within his correct time frame. He can face his zapping with dignity.

Well, then: as you read this, a gala fair will have taken place on September 13 at the Mohawk Mountain Ski Area in Cornwall, Connecticut. Its exhibits will have demonstrated the handling of our resources and our environment—both good handling and bad—and will have indicated what the future holds. The lesson will have been tamped home by such notables as actor Robert Montgomery, writer Isaac Asimov (who, if you ask me, generally plays hell with hubris), designer-philosopher Buckminster Fuller and Senator Abraham Ribicoff.

There will have been a pooling of knowledge from a number of experts. Fair goers will have visited displays about the environment and how to save energy and will have ridden up the mountain on a ski lift, though there will have been no snow (how's *that* for tempting the gods?). They also will have listened to music by the Paul Winter Consort and they will have watched the ascent of a balloonist and you will have missed a good fair if you didn't go.

The event is called HVA Day, and it's the first time it's taken place in eight years. The initials stand for Housatonic Valley Association, a dedicated group of Connecticut people who devote all possible time, money, talent and thought to the saving of an extraordinary New England river and its basin.

Since the Smithsonian smiles upon all attempts to conserve good things, and since I have a dear, distant nostalgia for what must surely be one of the nation's most beautiful rivers, I visited Cornwall and was led around the region and indoctrinated with Housatonic lore.

I had known the river well, years ago, at least along its lower stretches near Derby and Ansonia. Despite the brutally industrialized aspect of these towns, the Housatonic had broad reaches reflecting tall trees along the bank, and quiet back-

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waters, green with reeds and spotted by the colors of blossoms. Here I performed a barely explicable task in a barely visible vessel—a racing shell. I had never before really seen the matchless wanderings of the stream in northwestern Connecticut.

From the Great Falls Dam near North Canaan down to around Kent, site of the famous old school, the river rolls between wooded hills, keeping quite straight. It murmurs against inviting banks, chuckles over riffles, moves silently and purposefully down its deep stretches. Even today, this water is remarkably clean, winking in the sunlight, frothing over rocks, dark as the pupil of an eye in the pine shadows.

And even today the Housatonic valley, reaching upward in layers of forest and meadow, is remarkably free of hot-shot, fast-buck development. Instead, old farms grace the land, fitting into its contours as though fashioned by nature. And many old roads are narrow and bumpy, climbing right up over the same hills they climbed 100, 150, 200 and more years ago. One stand of white pine is said to be original growth—grandfather trees that settlers spared, now reaching high and straight for the sun. And among them, preserved like sacred ancestors, are ancient dead trunks, still too tough to fall.

The reason for this almost unique conservation in busy, no-nonsense New England is the HVA. Endlessly vigilant, the movers and shakers of this association safeguard their river and its environs from the casual corruption of surrounding industrial towns.

The association executives are a cagey lot, blooded in Manhattan and alert to the ways of developers. They traced one through British and Dutch holding companies to a Swiss bank. They're still eyeing it balefully.

The association also watches neighboring industries. The river is born up in northern Massachusetts, near Williamstown, and gurgles down through the spectacular and historic Berkshire Hills. One would think that such a tender upbringing might ensure a virtuous adolescence, but the river gets polluted in Pittsfield while it's still just a teen-ager.

There is a Massachusetts citizens' group that strives to guard the Housatonic, but what it gets in Pittsfield is a dose of PCBs—that family of industrial chemicals that accumulate in fish and endanger human health. The industrial source of PCBs has tried to control this pollution,

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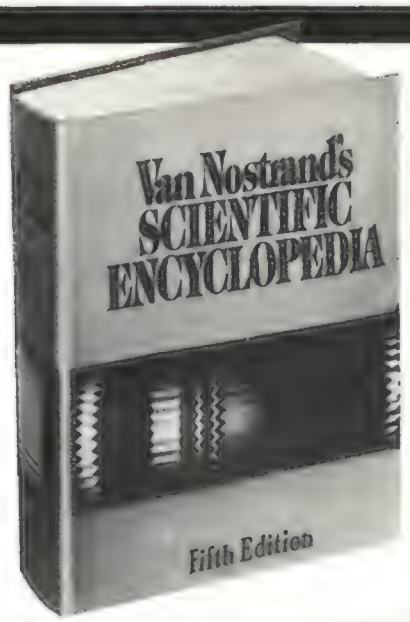

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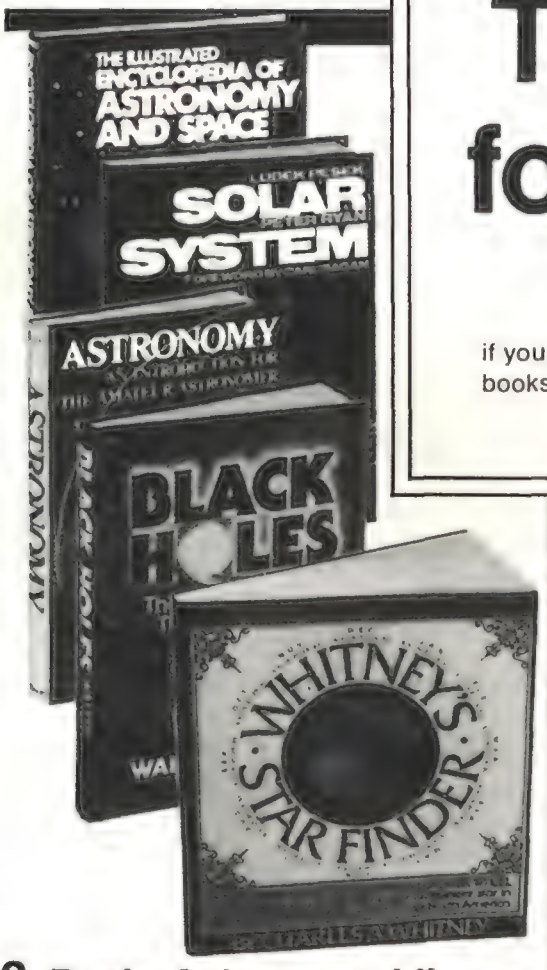

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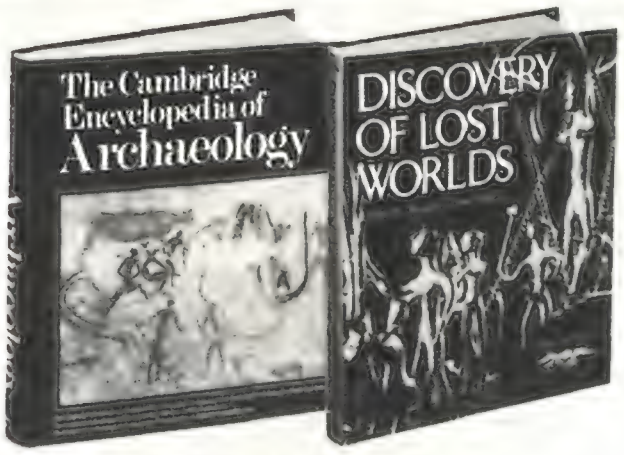

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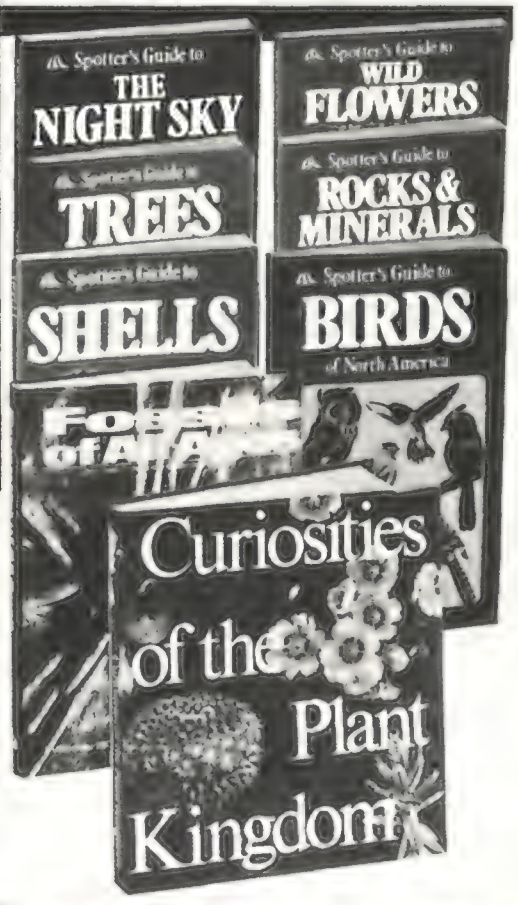

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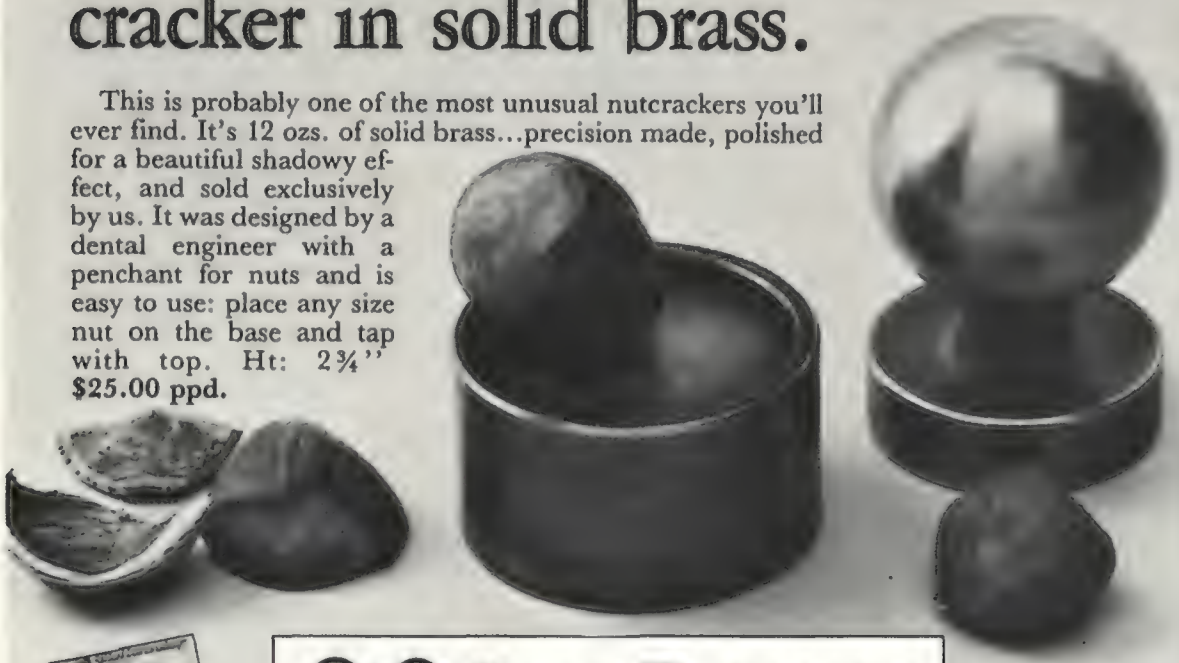

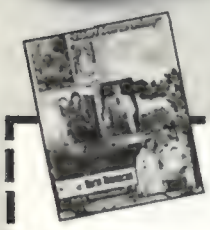

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but people are discouraged from eating Housatonic fish.

As the river matures, down in Connecticut it falls under the influence of its tributary streams, the Shepaug, the Pomperaug, finally the Naugatuck—slimy of character and wicked of intent. Its protectors fight off bad effects as best they can but, sadly, by the time the Housatonic slides into Long Island Sound it is unswimmable, its harvest of bivalves banned for human consumption. The HVA had its beginning in northwest Connecticut—Canaan, Salisbury, Sharon, Cornwall, Kent, Sherman and New Milford—but its watchful eye extends to Stratford, where the river empties into the Sound and where HVA would like to make the river safe and delightful for the millions who would like to use it near its mouth.

It's a pretty imposing purpose. But these volunteers go after funds, rouse support and lobby for their river. To tell the whole story of it would require a book. This lively, imaginative, intelligent private endeavor, enlisting whole neighborhoods, is an eye-opener.

You certainly will have had a fine time at that fair.

A letter arrived from a visitor to Washington taking exception to this column's description of joggers frustrated by construction on the Mall. The writer said that they should be called "runners," not "joggers," and that he was very happy to see so much of it going on in the nation's capital instead of long, alcoholic lunches.

I'm not surprised they changed the name to "running." You can't *say* the word "jog" without damaging your kidneys as much as does one of those lunches.

Walking across the Mall the other day, I noticed a sizable party of Washington children, aged about six to nine, playing a new and delightful game. Every time a jogger—I mean runner—came by, gasping and pain-racked, they would convoy him—surrounding him, running along beside him, chattering, imitating him.

They'd keep it up for half a block or so and then peel off and wait for the next poor devil to come panting and staggering along in the other direction so they could convoy him back again.

I must say the joggers/runners were very good-natured about it. When one is enduring the thumbscrew, one finds the bite of a flea highly diverting.

—Edwards Park

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Phenomena, comment and notes

Stars that are peopled by plasmobes, clouds of dust as our neighbors, and the invasion of the bandersnatch

We humans have always had a craving for exotic life-forms. When our daily routine included spirited disputes with giant ground sloths and saber-toothed cats, we wondered if still more fearsome creatures dwelled beyond the mountains. Our imaginations constructed apparitions as frightful as fire-breathing dragons and ship-swallowing sea monsters, as delicate and symbolic as unicorns and as much fun as the Loch Ness monster.

For centuries, we have flocked to zoos and circuses to see beasts that sounded laughable—elephants and giraffes—only to look into their eyes and realize they were fellow beings. Today, we continue to marvel at the navigation of birds, the scent-detection abilities of insects, the fragility of Arctic ecology.

But even on a planet teeming with exotica, from rotifers to blue whales, we want more. Somehow we are lonely, and many of us desperately want to believe, whatever the current scientific thinking, that dolphins are at least as smart as we are (p. 72). Some of us want even more desperately to know that we are not alone in the universe, but that it, too, teems with life, a life that comes to visit us in saucer-shaped spacecraft.

In the last few decades, two trends have converged to force us to look off the Earth for exotic life. We have explored the globe well enough to be sure there are no lost valleys where dinosaurs roam. New species continue to be named, but no animals as different as the kangaroo or the platypus. And astronomy has made clear that neither our planet, nor our star, nor our galaxy is unique. We are not one in a million but only one in uncounted billions, and it becomes more difficult to think that life exists only on Earth. Somebody must be out there.

Hungry for company, we have invented inhabitants almost as fast as we have come to understand the stars. What is now called science fiction is older than its name, a technical construct to allow us to consider what we really wanted to think about, life on other worlds. Martian chronicler Ray Bradbury, stopping by last summer, delightedly argued that science fiction is moving into art and music as rapidly as it has into films.

Science fiction certainly has gone far beyond bug-eyed monsters and invaders from Mars. As we have learned more about the universe, and more about the physics and chemistry of life, both scientists and science-fiction writers have been able to speculate in more vivid detail about what life might be like on the next planet or in the next galaxy.

When the Smithsonian's National Air and Space Museum opened its Life in the Universe hall six years ago, a major attraction was called Pick-a-Planet. Nine imaginary planets, offering different combinations of gravity, temperature and moisture, were populated with animals adapted to those conditions (SMITHSONIAN, October 1974). Two-legged antelope frolicked on a low-gravity planet, while the many-legged bandersnatch (inspired by a Larry Niven novel, *World of Ptavvs*) weighed 30,000 pounds on its high-gravity home. In all, 27 creatures were designed, one terrestrial, one aquatic and one aerial for each planet. All looked alien at first, but almost all ended up seeming vaguely familiar, new creatures fashioned by combining familiar parts.

Even the denizens of science fiction are often not so alien. Robert A. Heinlein's Vegan, in *Have Spacesuit—Will Travel,* is furry and large-eyed, looking rather like an elongated tarsier (p. 40). The paintings on these pages of creatures from science fiction are by Wayne Douglas Barlowe, from *Barlowe's Guide to Extraterrestrials,* done with Ian Summers.

The Czillian (p. 42) from Jack L. Chalker's *Midnight at the Well of Souls* at first seems more removed. It is, after all, a plant. But once we see it has a leaf for

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Editorial note: You may wonder why an 8" skillet is found in a line of quality French Commercial Cookware. Generally, French recipes say to cook in the smallest utensils in which the food will fit. That reduces the amount of fat you have to use. Also, if you are cooking your food in a stock, less stock and more food produce more intense flavor.

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photosynthesis, root tendrils for absorbing water and that it slows operations during darkness, we feel at ease.

Many writers have moved away from the familiar, however, and have come up with truly different forms. Isaac Asimov in *The Gods Themselves* gave us the Soft Ones (p. 46), intelligent, airy beings held together by attractive forces.

All these creatures, the familiar and the far-out, share one characteristic: they live on planets. In a new book, *Life Beyond Earth,* physicist Gerald Feinberg and chemist Robert Shapiro argue for a wider view. Leaving off a discussion of life on planets and moons, they say:

"We have seen that the planets, both those known in our solar system and hypothetical ones that may exist in other solar systems, offer a rich variety of homes for chemical life. Planets, however, comprise only an insignificant portion of the matter in the Universe. In most of the Universe, the conditions of temperature,

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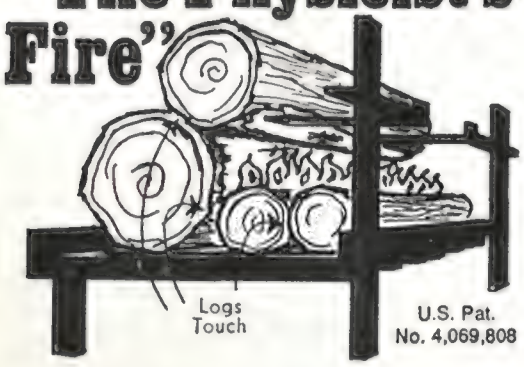

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pressure and energy flow are such that chemical life, based on molecular combinations and recombinations, cannot exist. For example, in the deep interior of stars, molecules and atoms are broken into ions and electrons. Are such environments necessarily barren of any kind of life? We think that this view is quite parochial."

They ask us to consider, for instance, a cloud of dust and gas floating between the stars close to the center of the galaxy. Even in a "dense" cloud, the atoms and molecules are so spread out that they rarely collide, but they can affect each other by exchanging radiation. The cloud has gone through a selection process much like the prebiotic chemical evolution on Earth, so there is a concentration of certain types of atoms and molecules.

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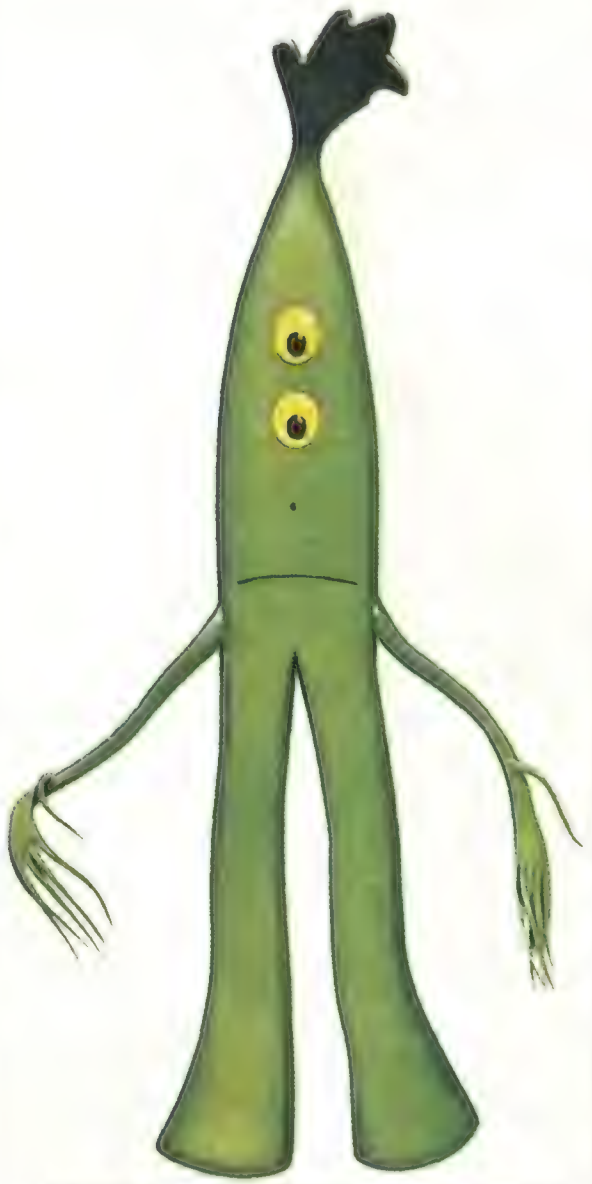

A Czillian is a walking, talking, seeing plant whose brains are in its feet.

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One rainy evening, a man with Gaelic on his breath delivered to my door a case of Glenfiddich. "Aon Braich," he murmured. No one here by that name, I mused. When I looked up, he had disappeared.

Upon cracking the cache of Glenfiddich with my Scottish Rites hatchet, I found each bottle of this distinctive malt whisky to be of triangular shape. Evidently, there were more sides to this story still.

Examining the label, I detected a most intriguing clue: Glenfiddich is Gaelic for 'Valley of the Deer.' Had this peculiar charade been nothing more than a cleverly staged stag party invitation?

A sudden revelation struck me like a belt from Savile Row. Perhaps the peat-stained pages of MacTurf's 'Scotch On The Lochs' would hold the explanation. I reached for my volume – but the book was gone!

It was then my friend MacIntosh rang. "Aon Braich!" he intoned. That strange name again! "I'd have returned the book myself, but with this downpour..." Then I saw my MacTurf tucked 'midst the malts.

A newly-marked page revealed that it was the Glenfiddich that was 'aon braich,' or single malt. One sip confirmed its singular character. Rarely had a case led me to such a splendid solution.

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emitted radiation can start the organizing process in a group of lifeless atoms nearby. This "radiobe" in turn consumes energy to achieve higher and higher levels of order, and to replicate.

"If this process appears too physical to be considered a type of life," the authors say, "readers are invited to consult a similar description of the information transfer between nucleic acid and protein in Earthlife and decide whether that process is any less physical."

They concede that matter is the main component of life as we know it and as we have imagined it. But they feel it would be "quite fitting" for electromagnetic radiation to be the basis for a form of life. "It is in many respects as significant a component of the Universe as what we know as matter."

Living inside a star

If we think of life-forms as requiring energy, why not go to the source, to the interiors of the stars themselves? This is a world of plasma where no atoms exist, only ions and electrons, dominated by intense magnetic fields. Feinberg and Shapiro offer us "plasmobes," creatures made of patterns of magnetic force and groups of moving charges, living in a sort of symbiosis. The magnetic fields impose a pattern on the charged particles, and the speeding particles create more magnetic fields. This reciprocal effect, which the authors find roughly analogous to the mutual influence of nucleic acids and proteins on Earth, can lead to growing stability. Parts of the inside of the star become orderly in that only a few of the many arrangements that could exist do (just as life on Earth uses only a few of the many carbon compounds possible).

Bathed in the energy surging out from the core of the star, with life processes carried out by the high-speed particles, the plasmobes have a very high metabolism, the authors suggest, and therefore a short life unless they are very large.

The interiors of stars contain much more space than the paper-thin biospheres around planets. And there are so many stars that if the matter in them has developed into life, Feinberg and Shapiro say, "the scope of such life will be immensely greater than anything that can be achieved by chemical life confined to planet surfaces."

The authors have many other living

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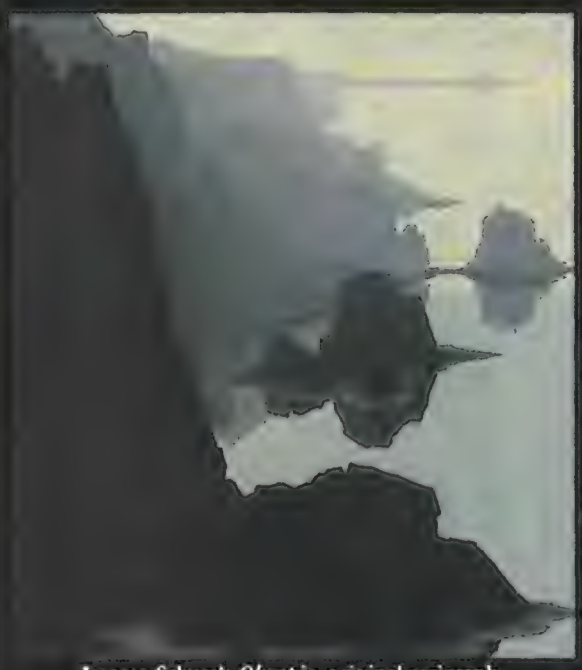

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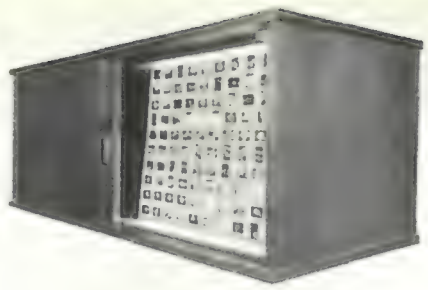
entities to propose—chains of long, thin atoms that can tolerate the crushing gravity on the surface of a neutron star, lifeforms composed almost entirely of solid hydrogen. But enough. They are excited, and want to keep looking. Unmanned probes to the planets and moons now, travel to the stars in the future.

The authors believe that popular interest in extraterrestrial life is not dying, but is growing every day, and they argue that the search for life beyond Earth is one area where popular interest and serious scientific concern coincide.

Whether we launch more space probes or not, our minds certainly will keep traveling the planets and the stars, populating them with magical beasts. And our storytellers, not sitting around the fires now, but speaking to us through high-speed presses and movie projectors, will make sure we never feel lonely.

—JOHN P. WILEY JR.



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Jim Springer, at left, and his identical twin Jim Lewis were separated in infancy, adopted, and never met

By Donald Dale Jackson

Reunion of identical twins, raised apart, reveals some astonishing similarities

When the "Jim twins" discovered each other at age 39, they triggered a new study of nature and nurture, with unexpected results

until last year, although they were living in nearby Ohio counties and led remarkably parallel lives.

Jim Lewis was jittery. To shore up his courage for the encounter to come, he had brought along his fiancée, his younger brother and his sister-in-law, but as he drove past the little white house just inside the Dayton city limits he still wasn't sure that he wanted to go in. The man who waited inside had told him on the telephone that he was the identical twin who had dropped out of his life only a few weeks after they were born 39 years earlier, but Lewis couldn't help wondering. Was it possible? Could this, this *stranger,* really be the brother his adoptive mother had told him about so long ago, or was this some kind of cruel hoax? And what if it were his lost twin and he turned out to be crippled, or drunk, or hard up for money? A hundred uncomfortable questions raced through his mind. They were early anyway, he told the others; there was time for a beer at the Pizza Hut—a few more minutes couldn't hurt—before this confrontation he simultaneously craved and dreaded.

Inside the house at 1159 Chelsea Avenue, Jim Springer smoked one cigarette after another and tried to suppress a similar rush of apprehension: did he need a kidney transplant, this twin who had suddenly materialized? Had he been in the war? Was he bald? What if he wanted money? Springer knew he was born a twin, but his adoptive parents had been told that his brother had died in infancy. He thought to himself that this was almost like meeting a ghost. And where the hell was he?

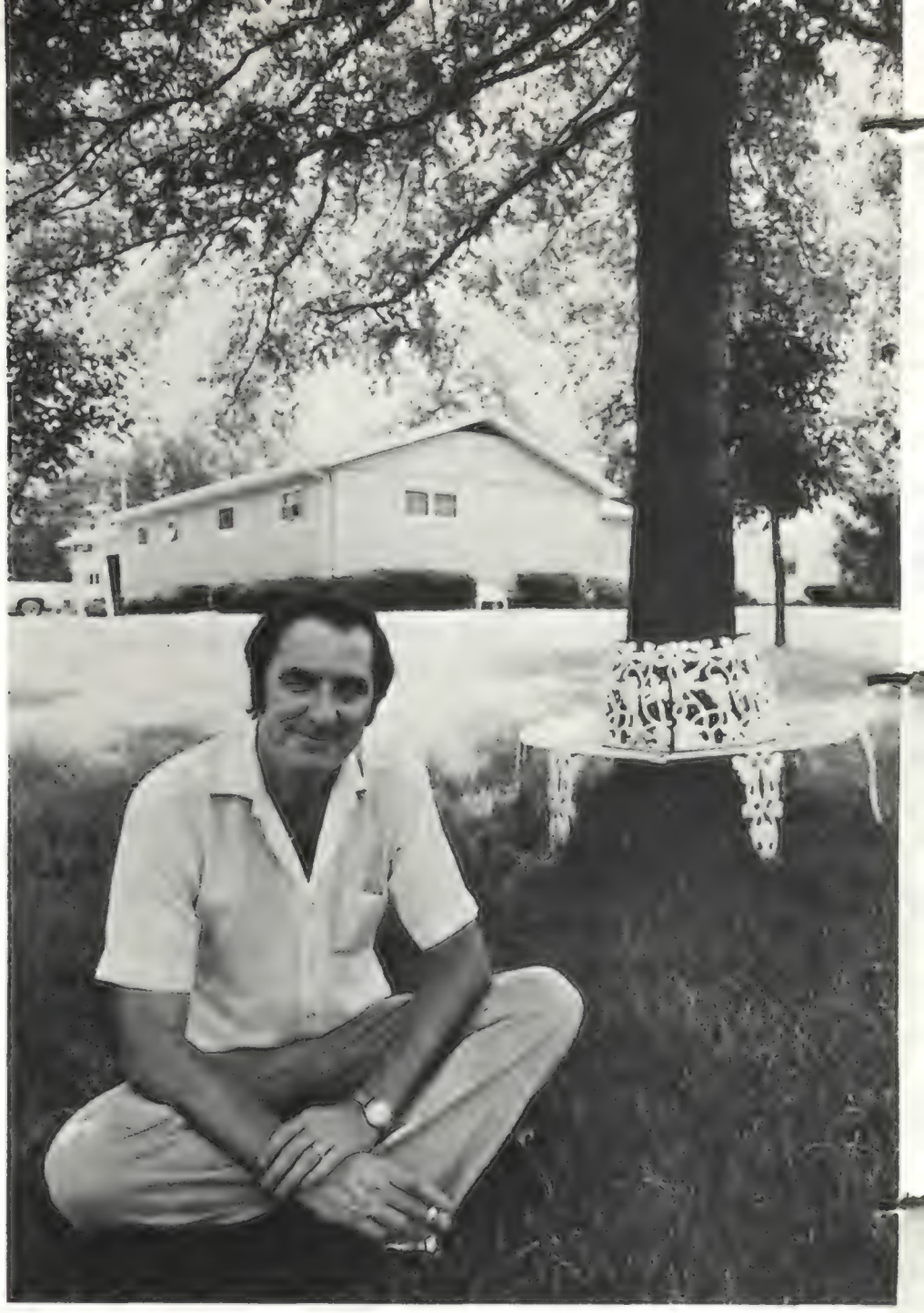
When the knock on the front door finally came,

Photographs by Enrico Ferorelli

Springer and his wife, Betty, opened it to find Lewis' fiancée Sandy at the head of a nervous procession. Behind her was Lewis' adoptive brother Larry and his sister-in-law Marie. Lagging in the rear, still wavering, was Lewis himself. As Springer recalled the moment, "Jim and I shook hands and then we all just looked at each other for a few seconds. Then we broke out laughing."

It was the superficial differences that struck all of them first: Springer wore glasses and Lewis didn't (they learned later that Lewis had worn glasses at one time and that their vision was identical); Springer combed his long brown hair forward, over his forehead, while Lewis' hair was shorter and neatly brushed back. But when Springer removed his glasses the final phantom doubts vanished: there was no question in anyone's mind that they were identical twins. "They were so much alike it was ridiculous," says Betty Springer, not only in size and coloring and features but "in the way they stood, the way they held their hands." When the Jims were left alone to share what they knew about their natural parents and the circumstances of their adoptions, their deep and drawling voices were so similar that the others couldn't tell who was speaking. A few minutes later the two men, both brimming over with emotion, got up and awkwardly embraced. "We just sort of let everything go," Jim Lewis says.

As they look back now on their reunion after 39 years apart, both twins see it as an almost mystical turning point in their lives. "Right off the bat I felt close, it wasn't like meeting a stranger," Lewis says. "I wish every family could experience that feeling," says Springer. "It was like we'd known each other all our lives and we'd just been gone a hell of a long time. God, every time I think about it"—his voice starts to break—"it just gets to me."



Jim Lewis has only house on his block in Elida, Ohio, with a white bench around a tree in the yard.

Above: Jim and Sandy Lewis with children Jeff and Kelly (son James Alan lives with Jim's former wife). Opposite: Jim and Betty Springer with children (left to right) James Allan, Stephanie and Lisa.

Jim Springer has only house on his block in Dayton, Ohio, with a white bench around a tree in the yard.

When they had first talked on the phone, the brothers had discovered a mutual taste for Miller's *Lite* beer. "I asked him what kind he drank," Springer recalls, "and when he said Miller's I said, 'Damn, so do I!' " But an occasion this festive clearly demanded something more. The Lewises and Springers toasted each other with champagne, often and ardently enough that the snapshots they took reveal a dewy-eyed reverie only partially attributable to the emotions of the moment. When Lewis was persuaded to brush his hair forward, the brothers looked like a matched set of slightly out-of-focus figurines.

Amid the euphoria of their rediscovery of each other, the brothers stumbled upon the first of a series of startling parallels in their lives and behavior, parallels which would almost instantly transform them into a kind of living laboratory for behavioral scientists, while at the same time turning them into quasi-celebrities. The first revelation was the names: not only had both been named James by their adoptive families, but they discovered that both had been married twice, that both of their first wives were named Linda and both of their second wives, Betty; Lewis had three sons, one of whom was named James Alan; Springer had three daughters and a son, James Allan; both had at one time owned dogs named Toy. The eerie pattern of the repetitious names ("We both just thought it was weird, that's all," Lewis says) would turn out to be merely the first of a series of similarities which would eventually go to the heart of one of science's oldest and most profound enigmas, the relative influence on human behavior of heredity and environment, genes and life experience—nature and nurture. The dramatic reunion of the brothers Jim, the story of a bond arbitrarily sundered only to be joyfully restored four decades later, was something else as well—a clue, perhaps, to the eternally intriguing mysteries of personality and behavior.

When the twins met again two weeks later at Jim Lewis' home in Elida, Ohio, some 80 miles north of Dayton, a local reporter wrote an article about them which was picked up by the Associated Press. Reading this story in the *Minneapolis Tribune,* a lanky University of Minnesota psychologist named Thomas Bouchard immediately recognized a once-in-a-lifetime scientific opportunity. The study of identical twins reared apart, Bouchard knew, was one of the purest and most definitive methods of separating the influences of heredity and environment; in the simplest terms, any differences between them—in behavior, personality, interests, values, even in physiology—

Donald Dale Jackson is a free-lance writer who lives in Connecticut. His most recent book, Gold Dust, *on the California gold rush, was published last March.*

The Jim twins both have similar basement workshops and they make similar things. Lewis (at left) makes

obviously would have to be due to the differences in their environments.

"I was trained as an environmentalist," Bouchard says, "but in recent years the evidence that genetics has a greater effect on behavior than we previously thought has been mounting. For me the chance to study identical twins reared apart was irresistible. It's the ultimate experiment in behavioral genetics." In less than an hour after he read the story, Bouchard had secured a preliminary grant from the university to fund a clinical look at the Jim twins which would include dozens of personality and aptitude tests in addition to extensive medical and psychiatric examinations. The Jims had met each other on February 9, 1979; on March 11 they reported to Bouchard's office in Minneapolis for an all-expense-paid week under scientific scrutiny.

"Dr. Bouchard said he wanted to get us before we were—what was that word he used?—'contaminated' by being around each other too much," Springer remembers. "I didn't believe him when he first called. It sounded, you know, too good to be true." It sounded even better when Bouchard told them that the invitation included their wives. Lewis and Sandy, his third wife, had been married only a few days before, with Springer standing beside his brother as best man.

The personality and attitude profiles which emerged from the Jim twins' tests stunned Bouchard and his colleagues. "We couldn't get over it," he declares. "I was expecting to find all kinds of differences because of their different backgrounds, but what leaped out at us were the striking similarities between the twins. I wasn't prepared for it. Nothing prepares you for it."

In one test, which measured such personality variables as tolerance, conformity, flexibility, self-control and sociability, the twins' scores were so close that they approximated the totals which result when the same person takes the test twice. "In intelligence, in mental abilities, in their likes and dislikes and their interests, they were remarkably similar," Bouchard says. "The pattern carried through in the little things that go together to form a personality," he points out, "the way you sit or gesture, the pace of your voice, your body language. They were like bookends."

Between the tests and their after-hours conversations, the Jims found that each of them enjoyed working with wood, making frames and furniture at their basement workbenches. Both had been indifferent students, Lewis dropping out in the tenth grade and Springer barely graduating from high school. Both had served as sheriff's deputies in nearby Ohio counties. Both drove Chevrolets, chain-smoked Salems, gnawed their fingernails, enjoyed stock-car racing and disliked baseball. They were amazed to discover that they both had vacationed at the same three-block-long beach on the Florida Gulf Coast.

The parallels in their medical histories were equally stunning. Both had slightly high blood pressure and both had experienced what they thought were heart attacks, with no heart disease diagnosed. Both had gained weight at about the same time and leveled off, again at about the same time. Both had undergone vasectomies. Most striking of all, both suffered severe

miniature picnic tables; Springer (at right) makes miniature rocking chairs with pincushions for seats.

headaches which began when they were teen-agers and continued sporadically afterwards. In both cases the headaches had been diagnosed as migraines; they generally persisted for about 12 hours and were not relieved by aspirin or other drugs. "What struck me," says Dr. Leonard Heston, a psychiatrist participating in Bouchard's study, "is that they used almost exactly the same words to describe the headaches." "It feels like somebody's hitting you in the back of the neck with a two-by-four," Springer told me. "It's centered in the back of the neck, and it damn near knocks me out sometimes," Lewis said. "I can always tell when my brother's got a headache," he went on, "by the way he acts—sort of sluggish. I know the feeling." Their brain-wave tests, which produce skylinelike graphs illustrating their responses to various stimuli, look like two views of the same city.

For Springer and Lewis, the weeks after their visit to Minneapolis were a whirl of head-turning celebrity. They appeared on Johnny Carson's show ("We stayed through three segments," Springer marvels), chatted with Mike Douglas and met fellow Ohioan Jonathan Winters at a Beverly Hills coffee shop ("He's a nut," Lewis alleges). Articles appeared in *People, Newsweek* and other magazines. A writer began work on a book and a film company expressed interest. They acquired —but later got rid of—an agent. Springer, the more gregarious of the two, did most of the talking, but neither man succumbed to delusions of stardom. Both are essentially small-town Midwesterners who have struggled—often working at two jobs—all of their lives; Lewis is now a steelworker, Springer a records clerk for a power company. One of Lewis' fellow workers might nickname him "Hollywood," but the two Jims know better.

The real beneficiaries of the Jims' season in the sun were Bouchard and his cohorts in Minnesota. Several other sets of identical twins who had been raised separately and later reunited got in touch with Bouchard after they saw or read about the Jim-and-Jim show. Two by two they arrived in the Twin Cities—an electronics expert whose brother was a fisherman in Florida, a pair of middle-aged British housewives, 16-year-old Nigerian boys who had both emigrated to the United States, two women who had lived much of their lives in St. Louis without knowing each other. By the summer of 1980 Bouchard had burdened his computer with data on 15 pairs and ferreted out leads on 35 more.

The pattern of behavioral and medical similarities which the Jim twins had exhibited recurred time and again. Not always, to be sure—and Bouchard is careful to point out that the findings at this stage are still tentative and suggestive, not conclusive—but often enough to indicate that "the genetic effect," in Bouchard's words, "pervades the entire structure of personality. If someone had come to me with results like this I wouldn't have believed him. I was aghast."

When a British pair named Bridget and Dorothy got off the plane in Minneapolis, they were each wearing seven rings. One had named her son Richard Andrew, the other had a son called Andrew Richard. Another pair of women shared the same phobias—both were uncomfortable in the water, in closed-in

Sandy Lewis finds Jim an affectionate husband. Like twin, he enjoys household chores on weekends.

places and at high elevations. Two other British women had the same rare thyroid disease, while four sets of twins struggled with the same speech defects. In one case both twins—young men—were homosexuals, though in another instance one was homosexual and the other heterosexual.

The twins who caused the biggest sensation were Oskar Stöhr of Germany and Jack Yufe of California. Separated soon after their birth in Trinidad, they had grown up in starkly different cultural surroundings: Oskar, raised by his grandmother in occupied Czechoslovakia, went to a Nazi-run school; Yufe was brought up a Jew by their Jewish father in Trinidad. Though differences in their attitudes persist, Bouchard saw arresting similarities in "temperament, tempo, the way they do things" as well as in their idiosyncracies—both wore neatly clipped moustaches, stored rubber bands around their wrists and read magazines back to front. Both also shared the peculiar habit of sneezing loudly in public to get a reaction, a trait which baffles scientists and passersby alike. "With some of these things," Bouchard smiles, "you can only shrug and say, 'It's in someone else's hands.' "

Does all this mean that there is a gene for public sneezing, another for jewelry preference and a third governing the choice of vacation resorts? Not quite. But while repeatedly emphasizing the danger of springing to conclusions before all the data are collected and analyzed, Bouchard observes that some characteristics thought to be environmental—phobias, for instance—may well have a genetic component.

Bouchard also suspects that twins raised apart may actually be more similar than those reared together, since pairs brought up together often emphasize and elaborate the differences between them. Critics contend that the twins' different environments have been inadequately studied and that adopted twins may not be a fair sample because the specific circumstances of the adoption may affect subsequent behavior. But Bouchard believes that most scientists are awaiting his conclusions with an open mind. "In a sense we're tempering the idea of the importance of the family in child-rearing," he says. "Our findings suggest that the subtle differences between and within families are not as important as people have thought in determining interests, abilities and personalities." He may be threatening an entire profession dealing with guidance and family counseling. The tree may not grow as the twig is bent after all.

The Minnesota academics also worry about the political and moral implications of their work, which could conceivably be misused to support theories of inherent racial superiority and such proposals as the high-IQ "sperm bank" promoted by Nobel laureate William Shockley. "People will try to bend our findings to support their own values," Bouchard fears. "Social judgments are not related to our findings, and shouldn't be. True science can be a two-edged sword, but I continue to believe that new knowledge, when properly used, will always have a beneficial effect.

A twin in search of his brother

"My house is near the end of the block," Jim Lewis told me on the telephone. "It's the only one with a white bench around a tree in the front yard."

Lewis greeted me at the door of his comfortable three-bedroom house and led me into the kitchen, where we sat down at a table. He lit a cigarette, poured a cup of coffee and began talking in a slow, even drawl about his boyhood and his search for his brother.

"My father worked as a boilerman for the school board in Lima," he said. "In his spare time he remodeled houses. When I got big enough I helped him. Neither of my parents had much education, and Dad wasn't home too much—he was always working. There were times when we were poor, when my dad was sick. I can remember eating powdered eggs. I got into trouble some at school, fights and stuff. Once I ran off to Cincinnati and my mom left me in a juvenile home there for 14 days, to teach me a lesson."

There was a controlled intensity about Lewis and a sense of somber strength. His gaze was level but not altogether open—something seemed held in reserve. His manner was courteous and somewhat grave. He smoked constantly.

"My mother told me I had a twin when I was about six, but I wasn't that interested. The only way she found out was when she went to the courthouse to get the final papers and told 'em my name was Jim and they said 'his twin's named Jim, too.' I got a little more curious about it as I got older, but I didn't do anything about it. I dropped out of school and went into the Marines when I was 17." His chin rested on his fist as he talked. "When I got out—I wish now that I'd stayed in—I worked in a bakery, drove a gas truck awhile, then got a job at the steel mill.

"I always kinda felt I wanted to have somebody close to me. I felt alone, I guess. When I was about five my mother adopted twin boys—Larry and Gary—and we'd fight all the time. I started thinking about having a twin after I grew up, but then I'd put it out of my mind. I was working two jobs—I was a policeman the same time I was working at the mill. Once about five years ago, I took off for Bradford—that's where we were born—to see if I could find him. I didn't really know what I was looking for, just hoping to run into him, I guess.

"Then about two years ago I got to talking to my mother about it and I decided to see what I could find out. I don't know why I did it then—maybe it wasn't meant to happen before. I went to the courthouse and they had his name. They got in touch with Jim's mother to see if it was OK and she called Jim and Jim tried to call me but I had an unlisted number on account of my police work. So he finally left a message with my brother Larry and I called him. I just right out asked him, 'Are you my brother?' and he said yes. I think we were both nervous wrecks on the phone. We didn't say much else, just arranged to meet at his place in Dayton."

Betty Springer finds Jim a demonstrative husband. Like twin, he scatters love notes around the house.

'Tickled to death' with each other

Getting up to show me his basement workshop and some of his woodwork—frames, a miniature picnic table, block letters spelling out "I LOVE YOU" in the bedroom—Lewis walked with a slight hitch. It was a tough-guy walk. "I gotta go talk to the loan companies tomorrow, tell 'em I'm gonna be late," he said. He smiled a slow, careful smile that gentled his rugged face. "I s'pose it could be worse."

He told me that his tastes in music ran to classical and country-and-western, in movies he liked comedies and good dramas but "not X-rated stuff," and that he cared little for politics, voting for Nixon twice and for Carter in 1976. "You know, Jim and me, we don't think too much about the similarities and all, we just accept it like it is," he said. "We're mainly just tickled to death to have each other"—the phrase sounded strangely soft, somehow out of character, but it was obviously genuine—"and we're enjoying it. I kinda like the publicity and all, too, but I know I'm no big wheel, I'm just riding the wave."

I asked him if his friends ever told him that he resembled anyone in particular. "Yeah, you know that guy that was in *Cheyenne*, Clint Walker, they say I look like him." I could see the resemblance.

Two days later I met the other Jim in the yard outside his five-room rented duplex in Dayton. "Hi there," he said in the manner of a comic master of ceremonies, "I'm Jim Springer." My first reaction was surprise at their different styles; they were obviously not carbon copies of each other. Springer wore a T-shirt inscribed "I'm only here for the beer" and carried a cocktail. His manner was animated and outgoing: he joked constantly, almost compulsively, and sprinkled his conversation with such modish expressions as "far out" and "it blows my mind." He spoke in his brother's voice, but the words came in rambling paragraphs instead of unadorned sentences. He seemed at once more vulnerable and less melancholy than his twin. I remembered a comment that Bouchard had made: however tantalizing the similarities, he had said, the differences between separated twins might ultimately be even more significant. I asked the same question that I had asked Lewis—did his friends say he looked like anyone in particular? "Dick Van Dyke," he replied without hesitation. I was startled to find myself in agreement.

Settling into a chair in his tiny living room, Springer turned down the volume on a record player blaring

rock music and lit a cigarette. He told me that his father had worked as a lineman for a power company. "He drank a lot," he said, "but he was never mean. We always had enough to get by." They lived in Piqua, about 45 miles from the town Jim Lewis grew up in. "My mother was very religious. I worked in a grocery store when I was a kid and later I fixed up used cars. I got out of the draft because I was married and had a baby. I became a meter reader in Troy and then got this job I have now. It's boring work, but I've been doing it too long to change."

He frequently replied to my questions with one-liners. "How did you do in school?" "I was there." "What subject did you like?" "Sex." "How far back can you remember?" "About six months." But the more we talked, the more the resemblances to his brother began to intrude on the differences. Like his brother he is demonstrative and affectionate with his family—both scatter love notes around the house. Both spend their weekends doing household chores and yard work. Like Lewis, Springer considers himself apolitical; he voted for Carter, Nixon and Humphrey in the last three Presidential elections. Both men dwell in the present and worry little about the past or future. "I saw the loan company yesterday," Springer told me. "I didn't have to tell them I'd be late, they take it for granted.

"The differences between Jim and me may be the differences between living in the city and the country," he said. "Maybe it was just wishing or maybe it was this bond that twins are supposed to have, but I always figured he was alive; it was like I had this secret playmate somewhere. I went chasing up to a bowling alley in Troy one time after some guy told me that he saw me there. I was looking for him. Then I went to Bradford where we were born and looked there."

The Jims were most alike, it seemed to me, in ways that the scientists can't quantify; they are, in the fullest sense of the phrase, kindred spirits. "If I know something will tick him off I don't do it, because I know it would tick me off," Springer said. "God, we're just enjoying each other. Nobody can imagine what it feels like." Jim Lewis had expressed the same thought in almost precisely the same words. "A couple of months ago we built a picnic table together, it was the first thing we ever made together." Springer rubbed his eyes. "Jim said he'd been waiting all his life to do something like that. And so had I. I just feel lucky as hell. I'm me and he's him, but at the same time he's me and I'm him. Do you understand?" He went into another room and came back with a framed scroll that his brother had made and given to him. "February 9, 1979 was the most important day of my life," the inscription read. "On that day we started a lifetime relationship together and we will never be apart again."

And that, it seemed to me, was the final truth of the Jims' reunion, not the genetic similarities or the environmental differences but the joyous consummation of a bond restored, of love regained—the triumph of family. Both Jims recognized that truth intuitively and reacted to it identically—with gratitude. The scientists can't prove it, but maybe their souls are identical too.

As I walked through the Springers' yard to my car I noticed something that I hadn't seen before—a white bench built around a tree, like the one on Jim Lewis' lawn. It was the only one on the block.

Since the reunion, Jim twins have found they are identical down to their fingernails, which they bite.

Get-togethers are emotional for twins. "I wish every family could experience that feeling," says Springer.

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By Walter Terry

An effort to save the masterpieces of modern dance

Young artists are attempting to re-create the works of Isadora Duncan, Ruth St. Denis and other innovators—before it's too late

The dance entertainer, the hoofer, has been with us in various guises since Colonial days. Cloggers, then tap dancers, and then tapping cloggers gave accent to the rhythms of the feet. Acrobatic dancers performed on the tightrope or on the even more difficult slack wire. Later came the "skirt" dancers, the eccentric dancers, the exhibition ballroom dancers and those precision "line" dancers who have found their apotheosis in today's 36 Radio City Music Hall Rockettes. Classical ballet was imported from Europe. George Washington himself admired the artistry of John Durang, son of a soldier of the American Revolution, and the first professional dancer of note to be produced by the new United States of America.

But early in this century there evolved in America a new kind of theater dance that, for want of a better name, was called "modern dance" or "contemporary dance." It came into being out of esthetic necessity. Its originators were rejecting the rigidities of ballet techniques as well as thematic material generally rooted in fairy tales or fanciful evocations of butterflies, flowers or sugarplums—material that carefully avoided reality or adult mentality. As for variety and vaudeville, simple entertainment was the goal. Nowhere in dance were there artistic challenges, intellectual and emotional stimulation or that rarest of art accomplishment, the illuminating of the human spirit.

Valse Brillante, danced by Repertory Dance Theatre's Linda Smith and Kay Clark, is Duncan creation. Isadora Duncan, who liked the freedom of tunics and robes, died when her scarf caught in car wheel.

Isadora Duncan (1878-1927), discarding the toe shoes, corsets and confining garments then associated with the ballerina, donned loose tunics and robes and invited America to discover how the peoples of classical Greece had danced. She envisioned a dance for the mature as well as for youth, for athletes, for poets, for philosophers. Ruth St. Denis (1877-1968), at the turn of this century, announced a new heresy: *she* intended to dance about God.

From these two mighty pioneering women and from St. Denis' husband and partner, Ted Shawn, America's modern dance evolved. They were revolutionists in the art of dancing, but their ultimate triumph lay in the fact that they were indeed evolutionary.

Today, 80 years after the initial stirrings of curiosity and experimentation by Duncan and St. Denis, and some 50 years after the first testaments and testings by Martha Graham, Doris Humphrey, Charles Weidman,

Color photographs by Jack Vartoogian

Michael Kelly Bruce solos in *Kinetic Molpai,* a work by Shawn who promoted dance as a career for men.

Kay Clark re-creates Ruth St. Denis' *The Incense,* produced after much research and rehearsal.

Helen Tamiris and the settler from Germany, Hanya Holm—the five major founders of American modern dance—we are just beginning to look upon their creations as masterpieces from our past.

Just as today's ballet producers seek to revive, restage or re-create masterworks from the golden age of 19th-century European ballet, and our great black tap dancers are restoring the earliest jazz dance forms to our stage, so too are the descendants of the first modern dancers seeking to provide a disappearing dance past with a vital present—and, they would hope, a permanent future.

The question arises, however, whether these pioneering efforts should be revived. *Can* they be revived and, if so, how? Should dances be updated or held to original form? Or should they survive, as danced by their originators, only in the limited number of dance films that exist?

The late 1970s was a turning point for America's

Ruth St. Denis choreographed *The Incense* in 1906 and kept performing it for more than 50 years.

modern dance; the past suddenly became inviting. Dancers of the new generation wanted to know where they came from and the best way to follow the dance pathways that once had made history.

Today, several groups are concerned with the revival of dances from our not-too-distant past. Among them are Duncan dancers, including the last of the "Isadorables" (Isadora's adopted daughters), and younger moderns who have espoused the Duncan cause; in Los Angeles, the students of Karoun Tootikian, who had been a principal teacher at the post-World War II St. Denis studio; in San Francisco, students of the pre-World War II Denishawner, Klarna Pinska; and, in the East Coast area, Marian Rice and her Denishawn trainees, and Joyce Trisler's Danscompany, coached in the Denishawn repertory by Pinska.

Also included in this list is the Repertory Dance Theatre of Utah, with its nine dancers, working to rediscover history on the campus of the University of Utah at Salt Lake City. Started in 1966 with a Rockefeller Foundation grant, the RDT company is run as a collective enterprise. Senior dancers Kay Clark and Linda C. Smith are elected artistic coordinators.

From its beginnings, the group's repertory has included a few works by veteran modern dance choreographers as well as new creations by young choreographers within the troupe.

Most recently, the RDT has prepared a program of early dance works presented in historical sequence—

Seen here in his own *Kinetic Molpai,* Ted Shawn sought to give choreography an artistic and virile form.

New Dance, dedicated to "the world as it should be," was created in 1935 by Doris Humphrey (right).

a kind of history lesson through performance. The program, "Modern Dance in America: The Early Years," will be performed at the Smithsonian October 26 and 27, and includes work by Duncan, St. Denis, Shawn (1891-1972), Tamiris (1905-1966), Humphrey (1895-1958), Weidman (1901-1975), the West Coast's modern dance pioneer Lester Horton (1906-1953), glimpses of Holm and words about Graham. In order to create "Early Years," the dance company had to seek every possible source of information for the monumental task of recapturing the past with choreographic, stylistic and ideological validity. Could it be done successfully?

A problem is pointed out by Murray Louis, one of the most brilliant of today's modern dancers, a pupil of that major innovative choreographer, Alwin Nikolais and, through him, a descendant of Hanya Holm. In his recent book, *Inside Dance,* he notes that today's dancers "look differently and dance differently. . . . An overly trained dancer does not have the skill to bring richness to simplicity. . . . It is difficult to find a scruffy ball of fire today. It seems to be all placement and pliés. The pugnacious thrust of a heel could set the space around the modern dancer to boil. But this has been noticeably refined by the cooling effect of a pointed toe."

The Repertory Dance Theatre's "Early Years," and its accompanying, informative script by critic Marcia B. Siegel, is the result of an intense period of research, study and rehearsal. The group used information from motion pictures, choreographic scores in dance script, written notes, interviews and, most important, from individuals who had actually performed the dances, had seen them or had studied with the choreographer who created them. Finally, some were pupils of pupils.

Company rehearses "Variations and Conclusion" from *New Dance,* part of the current revival program.

Rachel Nelson, Ford Evans, Michele Massoney dance *Little David* (1942) from Tamiris' *Negro Spirituals.*

Humphrey saw the drama and power in group movement and didn't show off soloists, even herself.

A 1966 staging of one of the *Spirituals* shows then-students Trina Frazier, Ben Vereen, Jane Honor.

How well does the Repertory Dance Theatre succeed with its challenging task? At the program's first performance in April in New York City, reception by New York dance critics was mixed, ranging from admiring to strongly disapproving. Anna Kisselgoff, dance critic of the *New York Times,* remarked, "With all its good intentions, Repertory Dance Theatre came up with unsophisticated dilutions of these intentions and of the pieces themselves."

An intensely gutsy "urgency to action"

My own reaction ran the gamut from recognition of accomplishment to disapproval. As a senior critic, I had seen, with the exception of Isadora, the originals and their companies perform. These oldtimers did not have today's highly developed techniques but they were intensely gutsy and they communicated what Martha Graham has called that "urgency to action." For example, in the old days, a leg did not simply execute a grand battement, a kick; instead, it reached into space and stayed there for an agonizing moment of suspension, or it thrust forth in anger or in ecstasy. A step was not just a step. It could be a stride or a progression, hesitant, determined or insinuating, or the planting of feet solidly upon the earth, or a caress, or an inexorable advance or tragic retreat—it was not just locomotor tracery.

In the New York performance, some of the RDT's restaging of the Tamiris *Negro Spirituals* captured that thrust of movement for which she was famous, while other sections seemed trivial, even vulgar at times. On the other hand, Weidman's *The Moth and the Star,* from his 1956 dance setting of James Thurber's *Fables for Our Time,* captured the choreographer's kinetic wit. But when the RDT missed, its efforts could be compared with a reconstructed Indian village in which the tepees were made of plastic and secured with aluminum poles instead of being built with the hides and boughs of real life.

In recent conversations between rehearsals at the campus theater, the young dancers of the company seemed certain that "Early Years" is an ongoing and changing enterprise. They are eager and determined to improve the present program through continued performing and through continuing suggestions from those who knew the originals. Kay Clark says quite firmly: "I do predict that we will become fantastic as time goes on. We're always finding new input from people. In reconstructing dance there is no single method that is totally satisfying—you've got to use a composite. There are people still living who can tell you not only steps but anecdotes, qualities of movement, images from personal memory, all of which can help us flesh out the dances."

RDT's Joel Kirby is cast in *The Moth and the Star,* originated by Charles Weidman who dances it at right.

Moth was adapted in 1956 from Thurber's *Fables for Our Time,* a foil for Weidman's own comic flair.

Clearly modern dance technique today is far in advance of the techniques used in "Early Years." But more than steps must be mastered in reconstructions of the past. Says Clark: "The old technique was fairly elementary. What we have to do—and are still doing—is to concentrate on image, to seek out the basic intent of the dance. Oldtime dancers were spirit, soul, heart and mind."

Dancer Michael Kelly Bruce agrees: "There is a different mental preparation for these dances. The technique is simpler than ours today but it is essential that the simplicity itself, the purity of the work, be realized. In a way, you put on a 'muscle costume' for each of these dances." For Robin Chmelar, who dances several works originated by Isadora Duncan just after the turn of the century, Duncan is the simplest to dance, yet the most difficult. "There is a stripping away of non-essentials," she says. "In today's slick technique, you can hide behind a spectacular jump."

Walter Terry works in New York, is dance critic of Saturday Review *and author of 20 books on dance.*

The procedure for mounting each of the historic dances in "Early Years" varied. Rehearsals went on in company studios or in the University of Utah's old Kingsbury Hall. But coaching sessions and practice also took place wherever and whenever there was time; individuals sought out advice from New York to Hollywood. They sat in screening rooms at the Dance Collection of the New York Public Library, the greatest dance archives in the world, or they huddled by screens at home to see movies, whole and fragmentary, of the dances they were preparing. They sprawled on studio floors while listening to reminiscences and they rehearsed and sweated on those floors as they strove to capture the past.

On occasion, someone from the Dance Notation Bureau in New York City would come to them with the score of a dance recorded in Labanotation, a highly accurate and detailed system. (It is named after Rudolf von Laban, pioneer, along with Mary Wigman, of Germany's modern dance, and it can record the position of thumb and the flicker of an eyelid as well as vast patterns by a huge company). After notators

Herman Boden and Bella Lewitzky appear here in a 1948 production of Lester Horton's *The Beloved.*

Bruce and Smith dance same work, based on a puritanical crime of passion; Horton loved spectacle.

set the dances, "live" experts would come to place final touches because, says Chmelar, commenting on one weakness of the notation system, "the breath of life is missing."

In order to achieve that "breath" in the company's version of Doris Humphrey's *New Dance,* Chmelar sought coaching in New York from Beatrice Seckler, who had appeared in that masterpiece in 1935. Miss Seckler (center front in picture on p. 64) urged her into an understanding of Humphrey's basic movement principle of "fall and recovery," a special tenet based upon the exploitation of the law of gravity that gave dramatic suspense to her dances.

With the Ruth St. Denis scarf dances, the dancers could not be content with the mere manipulation of the scarves. Executing the soaring, rippling, flickering, billowing patterns that the choreographer had devised was not enough. "We are always trying to capture that initial wonder not only of handling the materials," Clark explains, "but of having them actually dance."

Rachel Nelson, who performs her runs and turns draped in a huge cape (cover and p. 69) and flings 12-foot-long silk scarves, says at some point the material begins to feel like an extension of the body. "You take a deep breath and raise your arms," she says, "and suddenly they're more than 12 feet long."

In theory, the multiple-source procedure used by the RDT to stage its first program of historic dances was admirable. But there were pitfalls. The major mistake was to engage a dancer who was never a student of Ted Shawn and never a Shawn dancer to oversee two Shawn solos. The results lacked the square, sturdy, robust style of Shawn himself.

No one, of course, can imitate Shawn or St. Denis or Isadora or any of the other titans of America's modern dance. There was only one Isadora, inimitable. St. Denis, or Miss Ruth as she was known, was a star and her mere presence on stage was sufficient to light up the theater. Murray Louis, as a student, was once called upon to be a last-minute "super" in a St. Denis performance at a New York settlement house. He recalls: "The most evident thing about Miss Ruth was her aura. She literally glowed. When I saw her

she was in her sixties. Offstage she walked with such weight and difficulty you didn't think she'd make it to the door. But on stage she was radiant and, through some power, so transcended her physical being that the word 'magic' constantly came to my mind. . . . Half her life was spent with the gods, and the other half seemed to have been spent touring."

St. Denis liked to improvise. Repetition bored her. Shawn used to say that "Ruth had key places in her solos that were constant but what she did in between was anybody's guess! With a partner, she was a little better, although in *Josephine and Hippolyte* I whispered to her constantly about where to go next! It didn't really matter because she moved divinely."

That aura is on the mind of Kay Clark who performs the deeply devotional dance, *The Incense* (p. 62), originated by Ruth St. Denis in 1906. "What I try to do is fortify myself with the thoughts she may have had," says Clark. "I'm not trying to be her, but when I do that dance I find myself in another time period."

Much of St. Denis' style was taught to the company by Karoun Tootikian, who still prizes two China silk scarves used by Miss Ruth. "Miss Tootikian's attitudes in teaching us were very special," says Clark. "One of the interesting things she told us was that Miss Ruth had an extraordinarily supple back, and her arms were able to make extraordinary rippling effects. Doctors in the early days wanted to examine her to see if there were any bones in her arms!"

Senior dance critics, choreographers and dancers who saw Isadora Duncan have similar memories of her later years. They agreed that she was overweight, somewhat blowsy and sometimes inebriated, but they also agreed that when she moved, or even gestured, all flaws disappeared in the radiance of her art.

Her art was even more elusive than that of St. Denis. As St. Denis once pointed out, "Isadora was a concert dancer. When she left the stage, her dance went with her. I was always a theater dancer, so that those who followed me, even if they could not copy me, could make use of my dramatic theme, my settings, the trappings and physical properties of my theater of dance."

"Early Years" opens with four Duncan pieces from 1903-1907. Annabelle Gamson, a contemporary dancer who lives in New York and who is highly successful in her own evocations of Duncan, worked closely with the RDT dancers on the stagings and their attempts to capture something of this elusive genius.

Linda Smith, who dances in the reconstruction of *Valse Brillante* (p. 60), says she has no intention of trying to imitate the great star. "It's impossible," she says. "I try to take in as much information as I can about her, about her point of view, but when I dance, I feel like me, Linda."

Besides, Smith adds, "Isadora Duncan created those pieces for herself and her company. We are not imitating, we are dancing in her style. And if those pieces had validity in those days, they will also have validity on our bodies."

Aiming for accuracy of step and style

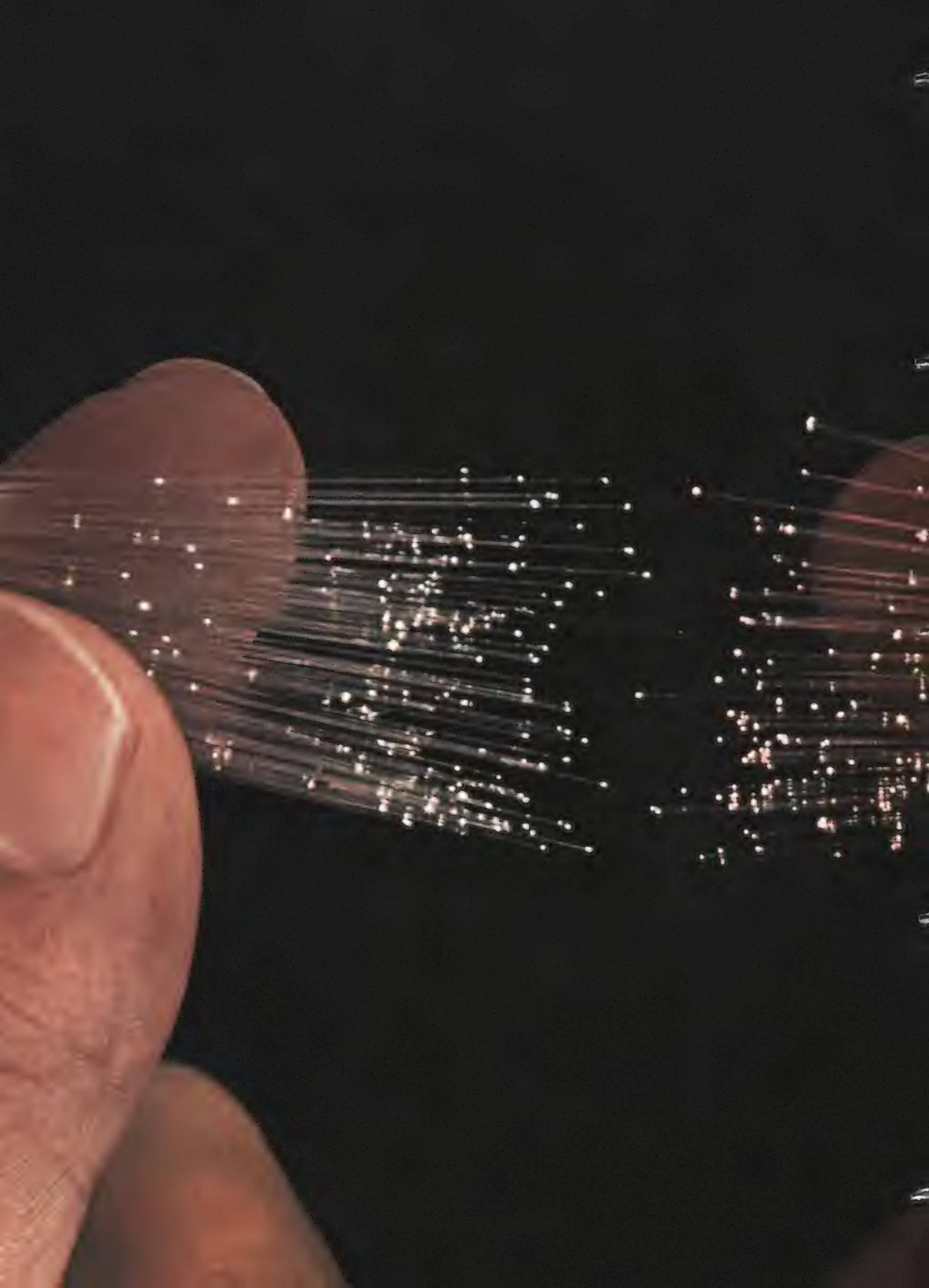
The dilemma facing those who seek to reconstruct the past in today's modern dance repertories patently goes far beyond aiming for authenticity of choreography and accuracy of step. How much of today's advanced modern dance technique, incorporating strong balletic training, can safely be employed in such revivals without destroying style and thus tampering with history?

Ballet has long faced this problem. When *Giselle* was first danced in the year 1841, the ballerina of that era could do little more than step briefly onto pointe. In her still-soft slippers, a far cry from today's sturdily blocked toe shoes, she could not execute turns or runs or other patterns on pointe. Such a technically limited *Giselle* would not be acceptable today. Modern dance revival has similar, if not quite as drastic, differences to consider.

As today's dancers and dance companies, among them the Repertory Dance Theatre of Utah, take increasing pride in their dance past and seek to restore to the living theater those dances that once made history, one hopes they will seek out the best and most knowledgeable sources.

But equally essential is a full awareness of the character of the originator and the intent of the dancer-choreographer. How could you dance Duncan if you did not know that her purpose was to express "the feelings and emotions of humanity" and that her supreme goal was "the highest intelligence in the freest body?"

With her scarf aswirl, the RDT's
Rachel Nelson performs dance
Ruth St. Denis originated in 1924.



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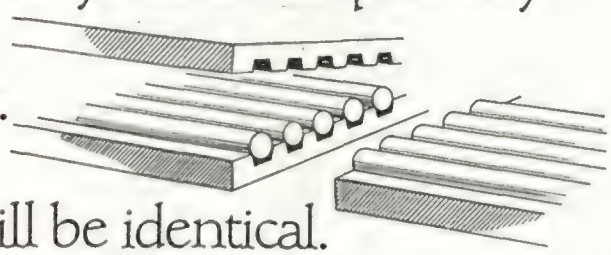

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By Michael Parfit

Are dolphins trying to say something, or is it all much ado about nothing?

Research on cetacean intelligence is booming, but where one scientist finds a 'language' another may hear only 'a rat's nest of sound'

Like the atmosphere of the whole debate over the intelligence of dolphins, the air at Flipper's Sea School was filled with an enthusiastic and sometimes discordant clamor. Laughing gulls cried, peacocks screamed, loudspeakers informed small groups of tourists about the value of green turtle shells and the feel of dolphin skin, Napoleon the heron screeched at larcenous pelicans, and dolphins leaped and splashed to the constant sound of human cheers: "All *right,* Gipper!" "Beautiful, beautiful, Longnose!" "Atta girl, Rose!"

The quietest thing going on was the research. Off to one side, from a plywood box in which a man crouched under a poncho behind one-way windows, came an occasional short, whistled tune. If I had not known what it was, I wouldn't have noticed it at all.

But the odd noise was a message, a request made by a human being to a dolphin in a code that resembled language. Although I knew that what it was asking was simple—that the animal touch a ball with its fluke —I knew also that the procedure represented a complex probe into a frontier of knowledge. Here, as at a few other places in California, Florida and Hawaii, people are examining, through language, an idea that has been broadly popular for years: that dolphins and their cetacean cousins, whales, may be among the smartest creatures on Earth, as intelligent as humans.

I arrived at Flipper's Sea School near the end of a trip I made to try to find out just how smart dolphins are. By then I had learned that the argument over their intelligence is both intricate and fierce, and seems to involve its participants in an intellectual and emotional tangle of metaphysics, science, speculation and hope so intense it sometimes doesn't leave much room for the simple beauty of the animals themselves.

I began, as anyone must, with the patriarch of what might be called the "smart dolphin movement," John Cunningham Lilly, M.D. "I invite you to entertain some new beliefs," Lilly wrote recently, "[that] *these Cetacea with huge brains are more intelligent than any man or woman.*"

In the 20 years that Lilly has espoused this view, based on his own research, many people, inspired by what they have seen of these sleek animals at sea, at the movies, on television or at oceanaria, and by Lilly's five books on the subject, have not just been entertained by this notion of surpassing intelligence, they've been captured by it. They've heard recordings of the sonorous tunes of the humpback whale, they've read of wild dolphins playing with children, they've seen testimonials from men rescued from drowning by porpoises. Grieving at all the ways human beings have found to behave foully on this planet, they're ready to believe in the dolphin Lilly describes: an alternate sentient being—benign, philosophical, and gifted with the patience and wisdom of the sea.

Lilly lives in the hills of Malibu, California. Stored there on tape are the voices of several bottlenose dolphins he worked with in the 1960s. One afternoon I stood and listened to one with him in a room walled with brown shag. Lilly was lean and almost bony, his slimness accented by one of the one-piece jumpsuits that seem to make up his entire wardrobe. Red light from the ceiling edged his face. He turned on the stereo and the room filled with the slosh of water and with a collection of sounds that seemed at once to be made by a drum, a rooting boar, a mouse, a smoke

A bottlenose dolphin takes breather from language research conducted at Flipper's Sea School in Florida.

Photographs by Matt Herron

Briefly out of his element, dolphin in a John Lilly research program is carried in a sling for a blood test.

alarm, a thumb rubbed on a clean plate, a bullfrog, a number on a push-button telephone, and the slow, theatrical opening of a castle door, all punctuated regularly by sudden, fierce breaths.

Lilly's voice was dry. "He's trying to convince us of something," he said, "and we don't know what it is. With that kind of repertory we don't think they're simpleminded."

But there is no peace between scientists. A few days later I negotiated the concrete maze of the Naval Ocean Systems Center in San Diego and met Forrest G. Wood, a Navy staff biologist who, back in the middle 1950s, first introduced Lilly to the voices of dolphins by playing him tapes.

"I'm not sure if I hadn't played him the tapes the world would be a different place now," Wood said with some regret. "Nobody other than Lilly, no *scientist,* I believe, has attempted to say how intelligent these animals are with respect to humans." He elaborated. "With all our ability to communicate and express insights, if we cannot come up with something to measure our own intelligence adequately, I can't see how we could do it with dolphins."

Among dolphins, what is intelligence?

Wood's sharp attack on Lilly's point of view and on his credibility as a man of science framed the argument. It also lit the warning flasher on the first substantial barrier I encountered to learning about dolphin intelligence. I soon found that most scientists agreed with Wood that intelligence, as a word and as a concept, becomes pretty fuzzy when applied to dolphins. That was why many scientists recoiled when I asked them to place the dolphin on an intelligence scale, between dogs and chimpanzees, say, or chimps and humans, although most of them simply replace the word with phrases that seem more specific: information storage capacity, plasticity, behavior potential, cognitive characteristics. These words and phrases allow them to move gingerly from a semantic debate into something more rewarding: the dolphin's brain.

Cetaceans have remarkably large brains in general. The sperm whale's brain is up to six times human size, and the bottlenose dolphin, the most studied cetacean, has a brain about the same size as ours. Raw size alone is not as significant as other factors, but Dr. Harry Jerison, a neurobiologist at the University of California, has developed a measure of what he calls structural encephalization, comparing the volume of the brain to the surface area of the body. This, he thinks, indicates how much of the brain's processing capacity goes beyond the amount needed to handle ordinary body functions. Jerison, a short, wry, cheerful man, places whales and dolphins near the human

Getting acquainted, researcher Gabrielle Lauer swims with Terry, one of two dolphins Lilly is studying at a California facility. The tank is equipped with audio system and a TV screen linked to a computer.

section along the "structural encephalization scale."

The anatomy of that mass of neurons is just as important as its size, however, and here again tangible specifics like volume give way to interpretation. In human beings that part of the brain known as the neocortex—the more recent structure, in terms of evolution—is often described as the area whose dominance of our brain's surface results in the capacity to create, innovate, solve, choose, articulate and reason, which we call intelligence. In the kangaroo, says a Russian scientist named I. N. Filimonov, the total cortical surface is 69 percent neocortex, in the macaque monkey it is 93 percent neocortex, and in the human it is 96 percent neocortex. In dolphins the neocortex covers as much as 98 percent of the surface.

But even this statistical hierarchy does not clarify much: the dolphins' expanse of highly folded neocortex is considerably thinner than it is in humans, and it differs in many other ways. Discussing brain anatomy is almost as bad as arguing about the word intelligence. The further in you wade, the more mired you become in the fallacies of direct comparison. But one broad conclusion reached by many of the people studying dolphins is appealing: their large brain's high metabolism is a prodigious consumer of fuel, and it's unlikely that the cetaceans made it 25 million years on merely a gas-guzzler mind. They're using all that power for something.

Once you start rowing out from the swampy shore

At console, John Lilly (right) and John Kert seek key to a common language for dolphins and humans.

Bill Lambaur at Marineland of Florida shows dolphin named Betty symbol in a comprehension experiment.

of brain size and structure you run into a sea of speculation. To Lilly, dolphins have used their brains to develop their own language, culture, oral history, philosophy and system of ethics—a concept that has led some believers to propose establishing diplomatic relations with the cetacean nation.

Forrest Wood and many others figure that the animal's incredible talent for finding and examining objects with its sonar probably puts much of that brain to use; this position is supported by recent Navy studies of records of electrical activity from the brain that "are consistent with a large percentage of brain devoted to auditory analysis." Dr. Kenneth Norris, a noted biologist who calls himself a "porpoise watcher," and who exudes an air of pragmatism even while engaged in flights of fancy, said that there are some researchers who speculate that dolphins may use their sonar sounds to project images into other dolphins' brains, and that dolphin sonar, which apparently can penetrate various substances in perhaps the same way hospital sonic equipment can penetrate a mother's womb to draw an image of an unborn child, may give the animals an in-depth understanding of each other that human society is denied. Norris himself doubts that it is likely to happen that way, but believes "some sort of sonic imaging is possible."

Stove in and wrecked by all these marvelous guesses, by now I wanted to encounter one of these creatures. But there was more to study. If you cannot learn the nature of the dolphin mind by looking at bits of its brain, and you aren't satisfied with speculative adventure, you have to look at behavior.

Observations of dolphin behavior have been largely gathered from lucky meetings in the wild or from captive dolphins. From this limited data most scientists have at least agreed that dolphins are highly social animals. Their relationships with one another seem intricate. Although there appear to be hierarchical arrangements within dolphin clusters, they may also have what one scientist calls an open society, in which members can move from group to group within a larger herd, like humans at a cocktail party.

In captivity they have been trained to perform amazing and often absurd tricks, like towing a dog on a surfboard or shooting baskets, tricks they can apparently remember for long periods of time. In a celebrated experiment dolphins were taught to present new behavior—leaps, spins, dives and splashes their trainer had not seen the animals perform, but tasks they apparently grasped with ease. Although this experiment is often cited as an example of dolphins being able to understand and use generalized rules, it does not prove that they are unusually clever; the researcher who performed the experiment says she has seen equally impressive creativity in pigeons.

In the wild, dolphins have shown some ability to

Michael Parfit wrote on synfuels in the March 1980 SMITHSONIAN. *He is the author of* Last Stand at Rosebud Creek, *which was published in July.*

After seeing symbols for "give" and "Frisbee," Betty retrieves Frisbee from several objects tossed to her.

Betty comprehends symbols and is being trained to make "sentences" by arranging them in sequence.

adapt to new situations, but the deaths of dolphins in tuna nets has declined recently owing to improved industry techniques, performance and gear, and not necessarily because the dolphins have learned to facilitate their own release. Kenneth Norris noticed off Hawaii that small dolphin schools learned to identify and avoid boats that were out to capture them. But with larger groups he has seen no evidence for animals transmitting such information.

To do that, of course, they'd have to have something like language. And language is at the heart of this debate. As human beings it's our specialty, the peak of our mind's achievement. So, when we go looking for something smart, really smart, the first thing we assume it should do is talk.

John Lilly postulates the existence of "delphinese," a dolphin "language" a bit like Norris' musings about image formation using sound, but with an intricacy that would allow it to carry historical and ethical information from generation to generation. Norris and many others challenge that assumption. "There isn't anything that even *hints* at language," Norris said, slightly irritated at the difference between what he clearly labeled as his own speculation and Lilly's assertions. "What I see instead is a great rat's nest of sound which nobody—*nobody*—knows about."

A number of experiments have, however, been aimed at unraveling that tangle. In 1965, in an experiment now considered a classic, Dr. Jarvis Bastian, a University of California (Davis) psychologist, separated two dolphins visually but not acoustically, then trained them so the first, a female, had to tell the second, a male, which of two paddles to push so both could be rewarded. During a series of tests the two whistled and buzzed back and forth, and the male pushed the correct paddle most of the time. But this didn't mean that the two shared some kind of detailed code or language. Bastian concluded it was just as likely that the female was making conditioned noises that the male had independently learned to interpret to his advantage.

Back in 1962, scientists watched five bottlenose dolphins apparently send out one of their group to examine an artificial barrier. The dolphin swam out to the barrier making sonar clicks and swam back to the group whistling, and shortly the entire group

Kewalo Basin Marine Mammal Laboratory

Louis Herman holds dolphin Phoenix as Akeakamai responds to the signal, "Akeakamai, Phoenix Over."

swam through the barrier together. But however common this kind of action may be for dolphins, it remains today a rare scientifically recorded observation of the animals scouting the terrain, and so stands isolated like a little patch of color in an obscure puzzle.

Thousands of feet of recordings have been made of dolphin sounds. In 1961 a Lockheed researcher said the 12 most common whistles he recorded in a tank containing nine dolphins were used in about the same frequency and order as the 12 most common English words. A few years later David and Melba Caldwell first published studies that clashed with both these data and Lilly's idea of "delphinese." At least 90 percent of the time, they said, each dolphin in a group is just whistling a single, stereotyped sound that may serve as a sort of name—a signature whistle—but is not at all like language. Now both Lilly and the Caldwells have been challenged by a young behavioral biologist, Dr. Sheri Gish, who today studies bird song at the National Zoo. During the middle and late 1970s Gish taped dolphins making sounds at each other over a two-way, underwater apparatus similar to a telephone. She found that most sounds were not the whistles some investigators have reported, but were clicks. She did not hear anything that she would call language.

"The exact information they're transmitting is unknown to me," she said. "But what they're doing is limited. It doesn't appear to have a syntax or any other attribute of language, assumptions made by some past researchers.

"Dolphins are unique among mammals," she continued. "We shouldn't confuse their behavior with human behavior. That's the mythology and it gets in the way of science."

Oddly, Melba Caldwell used a similar word. When I asked her why people are so fascinated by Lilly's hypotheses, she said mildly, "I think mainly because we can't find out anything about dolphins, so there does remain a mystery. So then you can attach a myth to a mystery. But the thing is: do you want answers to questions, or do you want to keep your myth?"

Today at least four separate groups of investigators, exploring terrain already found by ape-language researchers to be mined with controversy, are working to teach dolphins artificial languages. At Flipper's Sea School (so named because stars of the television series were trained there), dolphins are learning a whistle code. Near St. Augustine, Florida, graduate student Bill Lambaur is teaching two dolphins to recognize and use sheet-metal symbols. And in Redwood City, California, John Lilly himself, who is still respected as a scientist by many of his peers in spite of the scorn some heap upon him, is planning to beep and whistle at dolphins with an elaborate computer arrangement, observed by a constant stream of journalists paying homage to the durability of his vision. But the most advanced and dramatic work is being done by Dr. Louis Herman, a comparative psychologist specializing in the behavior of dolphins and whales, at the University of Hawaii. In a typical test, Herman puts a ball, a Frisbee, a hoop, a piece of plastic pipe and a fountain of water in a pool, tells a dolphin in a computerized whistle code to push the ball to the pipe, and the animal does as asked. More important, when he then asks the dolphin to push the pipe to the ball, the animal again behaves correctly, showing a rudimentary understanding of the structural differences we call syntax. Herman can also throw a ball in the pool and another dolphin will whistle "ball" in the same languagelike code.

A vocabulary of more than 25 "words"

Herman is a methodical man. "I'm thoroughly impatient with speculation and wildness and extrapolation," he said, with a confident, apologetic smile. "In scientific life there's no substitute for hard work and patience." Over ten years Herman has built a broad foundation of knowledge about dolphin mental capacity on which to base his language work. He has published studies demonstrating, among other things, that they can remember single sounds and series of sounds about as well as humans, that they can see clearly above water and underwater, that they can identify tiny changes in the pitch of sounds, and that they can learn a symbol. Now, although his current project has been going only a year and a half, one dolphin already understands a vocabulary in the computerized whistle code of more than 25 nouns, verbs and adjectives. The other animal has a similar vocabulary based on gestures of the trainer's arm and hand, and it can also recognize an object and name it in whistle language. At least one researcher thinks that polyglot dolphins, like talking apes, may simply prove the skill of trainers rather than the special ability of the animals themselves; but Herman and others do

At Flipper's Sea School in Florida, dolphin leaps high above flimsy wire fence, barrier against predators.

believe that something like language is taking shape.

"We have a whole philosophical issue centered around the uniqueness of human language," Herman said. "Is it in fact a unique specialization, or can we find at least an elementary language capability in some of the large-brained social mammals?" Listening to Herman, I thought: this world of dolphin research is clearly a frontier. After years of speculation and wonder made possible by some pioneering but perhaps too hopeful leaps of thinking, the real work has begun. And it's exciting. No matter what you expect to find, you become enthralled by the size of the unknown and by the promise of the new exploration.

In the lazy heat of the Florida Keys, Flipper's Sea School bustled with that excitement. It was alive with noise and laughter, like a mining camp that's heard rumors of ore.

I watched Mandy Rodriguez, 31, director of training, whistle in code to a five-year-old dolphin named Natua, who was born here. "If you had told me five years ago that I would be whistling a language to a dolphin named Natua, I would have taken you with a grain of salt," Rodriguez said. "But I think we're going to get a lot done in this language. I think we can get a common ground taking place."

I sat on a dock with Carol Smith, 24, a research trainer, while she talked happily in English and sign language to a dolphin nicknamed Longnose. "Their friendship goes so deep and true," she said. She waved her foot in the air. Longnose dived and leaped. "Beautiful, Longsnouts," Smith said. "You can't spend much time around these guys without falling in love with them; then you become an emotional tree hugger and suspect in some people's eyes. It's so hard to get it down on paper so it's not just a girl in a bathing suit saying, 'Oh, I *know* they're smart, I *know* they are.' "

I watched videotapes in a white van with Ron Reisman, 26, director of research, a college graduate in classical Greek and philosophy who has also worked with ape-language projects. Reisman has clamped a steel framework of scientific method—blinds, statistics, random tests—over Flipper's free-ranging approach. "The name of the game at this operation is quantification," he said, "to take the vast wealth of anecdote and speculation generated over the years and test these in a controlled situation and produce quantifiable results. Nice, hard data gets you somewhere." I asked him why he has turned down lucrative jobs to work here. "Obviously," he said, "I'm a hopeless romantic."

And there were the dolphins. Flipper's has 14 bottlenose dolphins held in large natural pools blasted from coral rock. Everywhere I walked they seemed to follow, cruising along beside the docks, each listing to one side to show one eye and a smile, watching speculatively, like crocodiles. They were more alien in person than on paper; the caricatures we draw of them, large brains and all, always wear human expressions. They were big, like streamlined horses, quick as otters, as firm and squeaky as rubber dolls, flexible as snakes. All grace and no hands, they could not move without flowing, like their sea.

On a warm afternoon I put on a mask and swam with them, at last. They passed before my face, slabs of shaded gray, patterned with scars, letting me slide my hand their length. One man has compared the first touch of a dolphin's skin to the feel of the new wet bottom of your own child, but this was a firmer contact, less emotional on both sides. I rode through the water grasping the base of a dorsal fin; I was whacked about the lower legs by flukes and noses; I dived from the quicksilver sky into heaving water and watched the shapes whirl around me, jaws, teeth, eyes, scars and flukes, a dance of speed and power.

I surfaced, breathed and ducked below again. A face met mine, head on, a strange countenance: the long, blunt beak, the eyes almost invisible from the sides, a broad forehead, the body tapering away behind. The head bobbed and nodded slightly in a sonar scan, and I heard a faint buzz as the animal examined my skull, my skin, perhaps even the shape of the air held in my lungs or the pace of my heart. I felt scrutinized and known. For a moment—my need to judge would return—intelligence seemed indeed an artificial structure, like the pyramid of species on whose summit we humans have placed ourselves. I rose to breathe. So did the dolphin.

Deep in conversation at Flipper's Sea School, Carol Smith asks Longnose if she wants to perform new trick.

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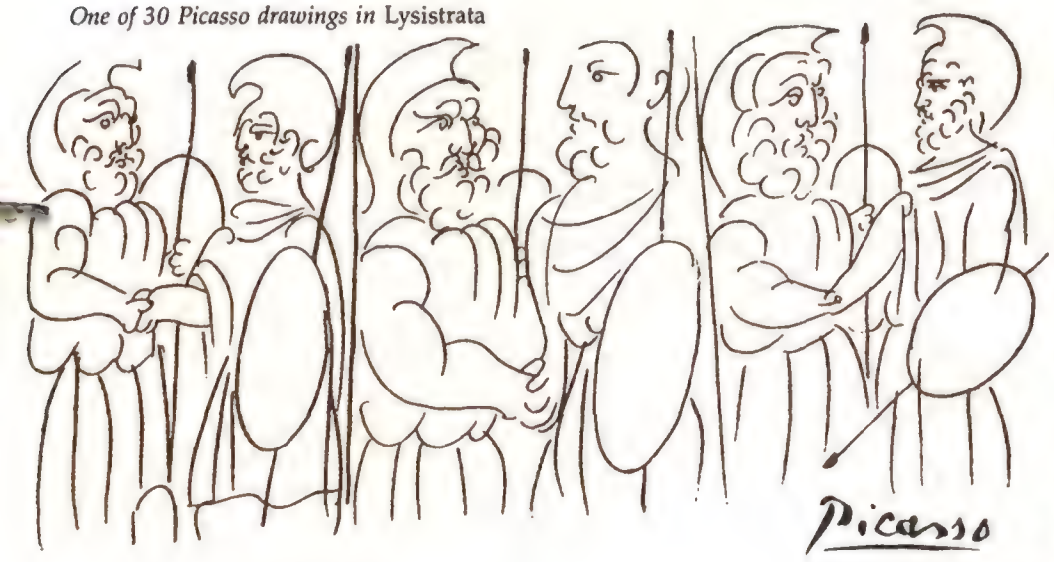

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MR. TOAD
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They made themselves comfortable in arm-chairs and waited patiently. Through the closed door they could just hear the long continuous drone of the Badger's voice, rising and falling in waves of oratory; and presently they noticed that the sermon began to be punctuated at intervals by long-drawn sobs, evidently proceeding from the bosom of Toad, who was a soft-hearted and affectionate fellow, very easily converted—for the time being,—to any point of view.
After some three-quarters of an hour the door opened, and the Badger reappeared, solemnly leading by the paw a very limp and dejected Toad. His skin hung baggily about him, his legs wobbled, and his cheeks were furrowed by the tears so plentifully called forth by the Badger's moving discourse.
"Sit down there, Toad," said the Badger kindly, pointing to a chair. "My friends," he went on, "I am pleased to inform you that Toad has at last seen the error of his ways. He is truly sorry for his misguided conduct in the past, and he has undertaken to give up motor-cars entirely and for ever. I have his solemn promise to that effect."
"That is very good news," said the Mole gravely.
"Very good news indeed," observed the Rat dubiously, "if only—if only——"
He was looking very hard at Toad as he said this, and could not help thinking he perceived something vaguely resembling a twinkle in that animal's still sorrowful eye.
"There's only one thing more to be done," continued the gratified Badger. "Toad, I want you solemnly to repeat, before your friends here, what you fully admitted to me in the smoking-room just now. First, you are sorry for what you've done, and you see the folly of it all?"
There was a long, long pause. Toad looked desperately this way and that, while the other animals waited in grave silence. At last he spoke.
"No!" he said a little sullenly, but stoutly, "I'm not sorry.
IF PRESENTLY REAPPEARED, SOMEWHAT DUSTY, WITH A BOTTLE OF BEER IN EACH PAW AND ANOTHER UNDER EACH ARM

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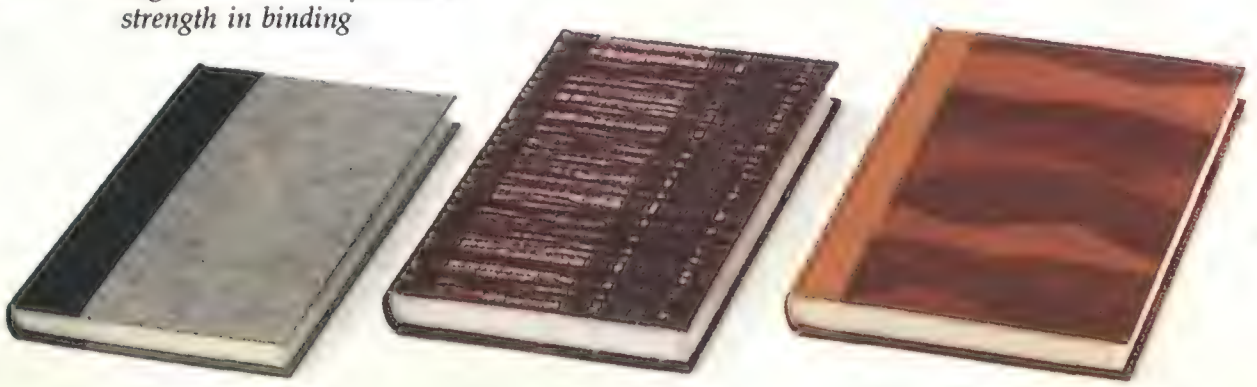

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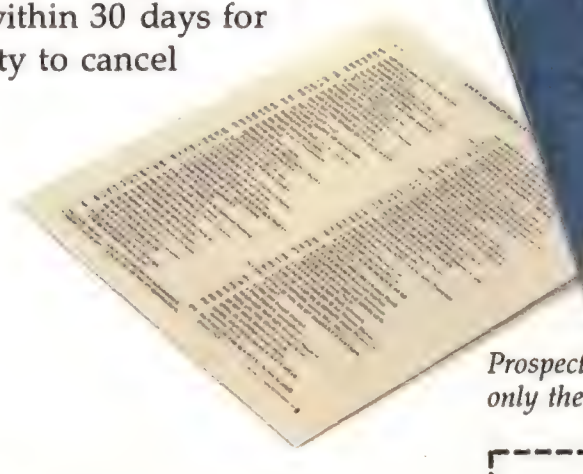

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By James K. Page jr.

Rebellious pueblos outwitted Spain three centuries ago

With precise planning and strong leadership, Southwestern Indians routed their conquerors and returned to old ways that still survive

On the morning of Saturday, August 10, three centuries ago, a Spanish soldier named Pedro Hidalgo was astride his horse heading north through the dusty, piñon-covered foothills outside the villa of Santa Fe, seat of the provincial Spanish government. Ahead of him rode Father Juan Pío, the Franciscan missionary who was to say Mass that day at the pueblo of Tesuque, only a little farther now. Pedro, armed with harquebus, sword and dagger, had been detailed by his commander at Santa Fe to accompany the priest on his sacred duties because there had been rumors of rebellion loose in the dry winds of New Mexico. And Tesuque, a smallish pueblo of some 200 souls, was considered one of the most restive of the six Tewa pueblos north and northwest of Santa Fe.

They had set off before dawn and one can reasonably imagine what was going through Pedro's mind as his horse plodded along the trail behind the implacably righteous friar: what foolishness to say Mass to the Indians! The Franciscan missionaries had been converting the heathen for at least 70 years, but the 16,000 or so Christianized Indians in the province mostly paid lip service to the friars and secretly went on with their own religious practices. What irony that a soldier had to guard a friar from his own converts.

Father Juan Pío and his soldier escort enter the ominously silent pueblo of Tesuque, August 10, 1680.

Illustrations by Arthur Shilstone

Po'pay, a primary leader of the revolt, seeks aid of spirits in a kiva (ceremonial room) at Taos.

Altogether, it was not a particularly attractive assignment for a Spanish soldier. Hidalgo was hundreds of miles from civilization—Mexico City—serving his tour of duty in New Spain's most remote outpost, protecting a couple of thousand Spanish settlers from marauding Apaches and from those occasional outbursts of the Pueblo people, and even having to protect the ungrateful Pueblo people from the Apaches—alternately dangerous and boring work. And lonely.

Pedro would have known that ten years earlier a great famine had wiped out half the population. Survivors ate leather straps and hides. The next year, 1671, a pestilence had killed many people and cattle. And the year following, the Apaches had sacked the province, stealing women, cattle and sheep.

Pedro probably also shared the general resentment toward the 32 Franciscans whose job was collecting souls, not gold. The friars were a law unto themselves in New Mexico, demanding and getting food and labor from the Indians. Many were independent, cruel, driven—competing directly with civilian authorities for Indian tribute and labor. They gave little heed to the government unless, as on this day, they felt they needed its protection.

Beyond a silent pueblo, death waits

Whatever Pedro Hidalgo's thoughts, they would have been unpleasantly interrupted when he and the friar topped a piñon-covered rise and glimpsed the pueblo of Tesuque below in the little valley made green by a briskly flowing tributary of the Rio Grande. From the rise, Pedro could see that the village was abandoned. No smoke. No squeals from the Indian babies. Nothing.

The two men entered the village, the clatter of their horses' hooves echoing throughout the silent dusty plaza, and continued toward the hills beyond, where they suddenly faced the men of Tesuque, daubed in the colored clay of war and armed with bows, arrows, lances and shields.

"What is this, children—are you mad?" Father Juan Pío's voice rang out. "Do not disturb yourselves. I will help you and die a thousand deaths for you." Summoning the Indians to return to the village to hear Mass, Father Pío entered a ravine, followed by the warriors. Pedro remained on a knoll.

Presently, the Indian El Obi came out of the ravine, bearing Father Pío's shield. Nicolas, the pueblo's interpreter, painted with clay, followed. He was spattered with blood. Other Indians emerged and several grabbed Pedro's horse by the bridle. Someone reached up and snatched his sword. His hat, too. Finally reacting, Pedro clutched his harquebus and jammed his spurs into his horse. For a hair-raising moment he

Indians, some on horses, overwhelm Spanish garrison as mission church burns. In a few days almost every mission in the Rio Grande basin was destroyed and 21 of the 32 missionaries were slain. The survivors fled.

dragged along the Indians holding his horse. Then he broke free and raced back to headquarters.

At 7 A.M. Pedro arrived at Santa Fe and poured out his story to the provincial governor, Antonio de Otermín. The latest in a long succession of governors of this frontier province, Otermín was already aware that trouble was brewing but had no idea that the death of Father Pío was one minor incident in a major uprising, a well-planned, coordinated revolt that in only a few weeks would drive the Spanish down the Rio Grande and out of New Mexico.

But there is a question here, yet to be resolved by historians. How was it that Pizarro and a handful of adventurers brought the Inca empire to its knees in a matter of months? Or Cortés and the Aztecs? And on the other hand how was it that, after more than 80 years, colonists of New Spain, some 2,800 of them, were unable to dislodge from their customary ways the Indian inhabitants of threescore small villages—the biggest of which housed 3,000 people—but instead were thrown out? How is it that the Incas collapsed, but the Pueblo people of the Southwest—from Taos, New Mexico, to the remote Hopi pueblos in Arizona—retain their traditions to this day and to a degree unparalleled among native Americans?

It has something to do with the personality of a man named Po'pay, a man who must have had concentrated in his soul all the essence of his people, for how else can leaders arise? Po'pay had been born in the pueblo of San Juan, or, as its inhabitants called it, Ohke, perhaps meaning "hard grinding stone." San Juan had been one of the first pueblos to welcome the Spaniards in the 1590s and for a few years had been the site of the provincial government until that was moved to Santa Fe.

In 1680 Po'pay was a resolute man. He was also

Originator of "Phenomena, comment and notes," and former chief of Smithsonian Exposition Books, Mr. Page is a student of Arizona's Pueblo Indians.

in touch, the contemporary Spaniards tell us with revulsion, with demons—spirits. (You must understand that everybody then believed in the supernatural. The Spanish considered the denizens of that world largely evil; the Pueblo people thought them merely part of the real world, some good, some bad, as real indeed as the rocks of the mountains, the scent of the wind.)

Now, Po'pay, it is recorded, was among 47 Indians arrested and brought to public humiliation in 1675 by Governor Treviño on charges of practicing sorcery and witchcraft. Of the 47, three were hanged. The rest were physically punished.

Po'pay set out, after his punishment, to rid the area of Spaniards. Considered a sorcerer still, he was ridden by the *maestre de campo* at San Juan until, like any revolutionary, he went underground—in Taos. In an underground ceremonial room called a kiva (but which the Spaniards called an *estufa*, meaning stove, because smoke issued forth from a hole in the roof) Po'pay plotted the ultimate rebellion with the advice, it is said, of three spirits.

There had long been resentment on the part of the Indians, naturally enough. Both branches of the Spanish authority—civil and ecclesiastic—had almost completely enslaved the Pueblo people, demanding labor and tribute in the form of hides, textiles, food and other products. Far worse, the Spaniards had destroyed sacred objects.

There had been periodic uprisings, but generally by one or only a few pueblos at a time. They had come to naught. There were three different linguistic groups in the New Mexico pueblos and they rarely saw eye to eye, though they had much culture in common. Even within tribes, individual pueblos were independent of each other, rather like the cities of ancient Greece. In the years before 1680, famine, drought and pestilence reduced the native population of the Rio Grande. Now it was half of what it had been when the Spaniards had arrived.

The Pueblo people may well have taken these events as acts of the gods. It is "very likely that Pueblo leaders viewed these tragedies as signs," says the Tewa historian Alfonso Ortiz, "signs that the spiritual keepers of the roads of life were displeased with the harsh new ways introduced by the invaders into this great valley of the Rio Grande, which they had bequeathed to the Pueblo people in a prior age." It was not so much the economic bondage but the disruption of the Pueblo sense of harmony, maintained by ritual, that powered the revolt.

They would have to "restore . . . the ancient teaching," says Ortiz. Thus "this vision of the beginning, a fresh, ever-renewable and vigorous beginning," had to be reaffirmed or the earth's vitality would die. The Pueblos were ready for Po'pay, but one can only imagine the subtlety and power of persuasion he must have possessed to bring those independent-minded, fractious villages to the point of unity.

Days counted by untying knots

In the summer of 1680 the Rio Grande was running high. It would be good for the agricultural cycle, but there would be little time for farming. Po'pay issued his orders. The pueblos would rise up on the 13th of August. Because he feared a leak, he subsequently changed it to the 11th. (A decisive man, he had even killed his son-in-law, who he feared might reveal the secret.) Runners, the swiftest of foot, were sent forth carrying knotted cords. One knot was untied for each day until it was time to strike. Word reached the Zuñi, some 200 miles west, and even the Hopi, more than 100 miles beyond. Throughout the province the knots were untied, a countdown to rebellion.

On August 9, two trusted messengers of Tesuque named Catua and Omtua were dispatched to the southern Tano pueblos, and to San Marcos and La Ciénega. The message, besides a cord with two knots, was: join the rebellion or be destroyed by the rebels. The Indian governors of these pueblos considered the message and refused to go along with it.

Catua and Omtua carried their message to the next villages, while the Indian governors went to Santa Fe and told Governor Otermín of the upcoming rebellion. He promptly dispatched his *maestre de campo* to find the two apostate messengers. They were arrested and taken to Otermín that day, the 9th of August, pleading ignorance of the reasons for the rebellion (only the elders knew, they said) and cunningly explaining that the mathematics of the knotted cord meant that it all would start on August 13, not the 11th. The Spaniards, satisfied they had the truth and

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After Spanish resistance collapsed, Governor Otermín led remaining settlers south to El Paso. Indians

believing they had four days until trouble would start, began deliberate efforts to gather more information.

But the leaders of Tesuque heard of this and, gathering together on the 9th, decided to start right away—at dawn on the 10th. Runners passed the word. The other northern pueblos received the message by the morning of the 10th. Most of the outlying pueblos got the news that afternoon; far to the west, the Hopi never learned of the change of plan. On the originally agreed date, the 13th, Hopi warriors hauled missionaries and soldiers out of their houses and cut their throats. In Oraibi and other towns they destroyed the mission church and threw the rubble to the four directions. Some of the beams from the church were dragged away and used in repairing the roofs of Oraibi kivas, where they are to this day; and some of the smaller church bells are still in use in Hopi ceremonies. (One Hopi narrator says that it wasn't Po'pay who instigated the rebellion, but instead the Bear Clan chief of Oraibi who, disgusted with the corruption of Hopi ways by the missionaries, told an all-Pueblo meeting held at Zuñi that it was time to kill all the *Castillas.* A historian from Jemez Pueblo suggests that Po'pay was merely one of several Indian leaders from various pueblos who inspired and led the revolt. Each village has its own oral history.)

In any case, the Tewa people of Tesuque anticipated the August 10 starting bell, killing a bystander named Cristóbal de Herrera on the night of the 9th. The next morning they eliminated Father Juan Pío, letting the soldier Pedro Hidalgo escape to Santa Fe. They subsequently killed off other local Spaniards, and destroyed the mission and the outlying haciendas.

So it went in pueblo after pueblo in the north, a well orchestrated uprising that saw many Spaniards killed and scores of refugees fleeing toward Santa Fe and the protection of Otermín's forces.

In the pueblos to the south, where some chiefs had balked at accepting the message of the knotted cord, the people rose up anyway. The Indians killed the missionaries, took possessions from convents and ran off cattle and sheep. Perhaps they feared Po'pay's draconian order to join or be killed, and perhaps they believed his offer—one woman for each dead Spaniard.

By the end of Saturday it was a considerable rout: hundreds of Spaniards dead, many in flight to Santa Fe and to the southern pueblo of Isleta, which had remained at peace. And in Santa Fe the governor was still unaware of the extent of the disaster.

Believing the southern pueblos friendly, Otermín sent a trusted Indian messenger named Juan, of the Tano tribe, south to seek aid. The next time he saw

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the messenger it was August 15. Astride a horse, Juan led a horde of southern Indians toward the gates of Santa Fe. He was bedecked with Spanish military equipment—harquebus, sword, dagger—and a red taffeta sash from the convent at Galisteo.

Juan sought to confer with Governor Otermín. With a nice appreciation for the outrageous, he extended two crosses. Choose the red cross and it meant resistance to the Indians. Choose the white cross and it meant surrender and departure from New Mexico.

Otermín chose not to choose. Juan left and the Indians attacked, shouting, ringing bells and firing the nearby chapel of San Miguel. Attack and counterattack followed. The Indians cut off the water supply; the Spaniards drove them back and restored the water. The northern pueblo warriors joined the siege and Otermín realized the jig was up. On the 21st of August the Spaniards, with some 100 soldiers and 900 civilians, having learned another group of refugees had gathered at Isleta to the south, broke out of Santa Fe. They headed south, watched and sometimes harassed by Indians from rocks and mesas. By September 29, after a melancholy trek through abandoned pueblos with burned and pillaged churches and sacked haciendas, stacked with Spanish corpses, the humiliated Spaniards (including more than 1,000 refugees from Isleta) reached El Paso.

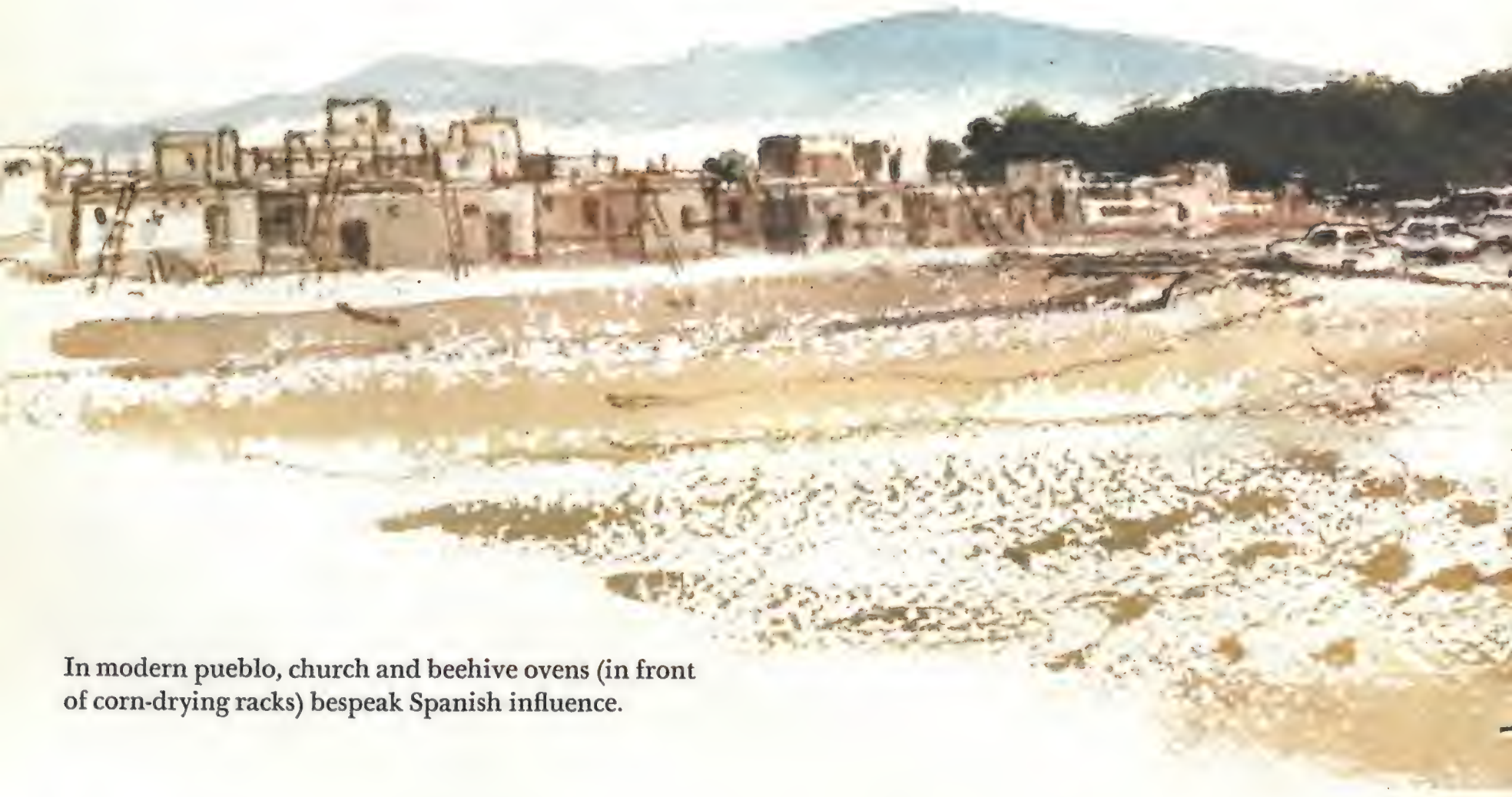
By the time they arrived they were bickering among themselves as to what to do next. It wasn't until the following September that the supply train of wagons from Mexico City finally arrived, encouraging them to believe that they might retake New Mexico. So, a year after their peremptory dismissal from the province, Governor Otermín and about 150 soldiers (with more than 100 Indian allies) headed north.

Their first real encounter with the Indians was at Isleta, where they found little resistance and marched, triumphant, into the pueblo (one, it should be remembered, that had not joined in the revolt in the first place). Ultimately they moved as far north as Cochití, just west of Santa Fe. The Indians appeared to welcome them back, as the Spanish had hoped. A man named Alonso Catití, one of Po'pay's original lieutenants and a leader of the Queres people, fell tearfully on his knees, repented his sins and kissed the feet of the attending friar. Within a day, notice of the peace and reconciliation was being sent throughout the countryside.

It was, of course, a con.

The Indians planned to pretend repentance and relax the Spaniards, then to send the prettiest Pueblo girls to make a meal for the heroes, seduce them and see to it that they were sound asleep. The strongest warriors would attack in the night with clubs; another group would steal the horses. The Spaniards heard of this from an Indian and returned ignominiously to El Paso.

After more than a month in New Mexico, Otermín's



In modern pueblo, church and beehive ovens (in front of corn-drying racks) bespeak Spanish influence.

expedition managed to burn or sack 11 pueblos, to pick up 385 Christianized Indians out of the 16,000 in the province, and to accomplish nothing more.

Under military inquisition, the officers of this ill-fated expedition testified that the Pueblo Indians were reluctant to give up their ways, were probably unconquerable by anything but a major army, and simply didn't want to be Spanish.

And yet, after all, the Spaniards returned. They re-established themselves and stayed until early in the 19th century. The various tribes, the various villages had resumed their previous squabbles, overlaid by fear of Apaches. Some Indians felt the loss of economic benefits of the Spanish system. The revolutionaries were put down—Indian against Indian. The Church returned to reclaim its souls.

You can see, in most pueblos today, a Christian church dominating the horizon. The village governors still carry silver-headed canes, signs of political authority that the Spaniards had issued their predecessors beginning in the 1620s. On the maps today it says San Juan Pueblo, not Ohke.

What, then, is the meaning of the Pueblo Revolt? Is it merely an aberrant and irrelevant moment in history? If so, why have the Pueblo people united once again, 300 years later, to celebrate the tricentennial of this event? Throughout Pueblo country—from Taos to Hopi—the year 1980 has been given over to dances, feasts, craft fairs. Runners with their knotted cords are loping the highways, some of them the ancient routes of rebellion. Is this a public-relations stunt, a chimerical, wishful bit of nostalgia? Was the short-lived Pueblo Revolt—altogether unique in the history of the Spanish frontier—merely a parenthesis in the long sentence of domination of these few people?

In Ohke pueblo this year the river runs high, as it did 300 years ago. Not far from the great river's torrent and down below the trim adobe village is an untidy desk in a trailer behind which sits a tall, almost gangling man named Herman Agoyo. Outside the trailer one can hear the *witchity-witchity* of a warbler on its own ancestral road of life. I asked the tall administrator of the All Indian Pueblo Council Tricentennial Commission two questions.

Why did you survive? What did you accomplish?

"Because of the Pueblo Revolt, we survived," he replied, answering both at once. "When the Spaniards returned, they knew it was possible that the villages might do it again. They backed off. They left our religion alone. We preserved our culture."

Agoyo pointed out that the 385 Isleta people who went to El Paso with Otermín after his attempted reconquest became "Mexicanized." Their descendants are still there; they have lost their original language though they recall a few of the ceremonial songs. They are seeking to reclaim their way of life.

"If it hadn't been for the rebellion," said Herman Agoyo, "we would all be like them."

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Artist Peterson sits in his Connecticut studio with some wild turkeys still on the drawing board.

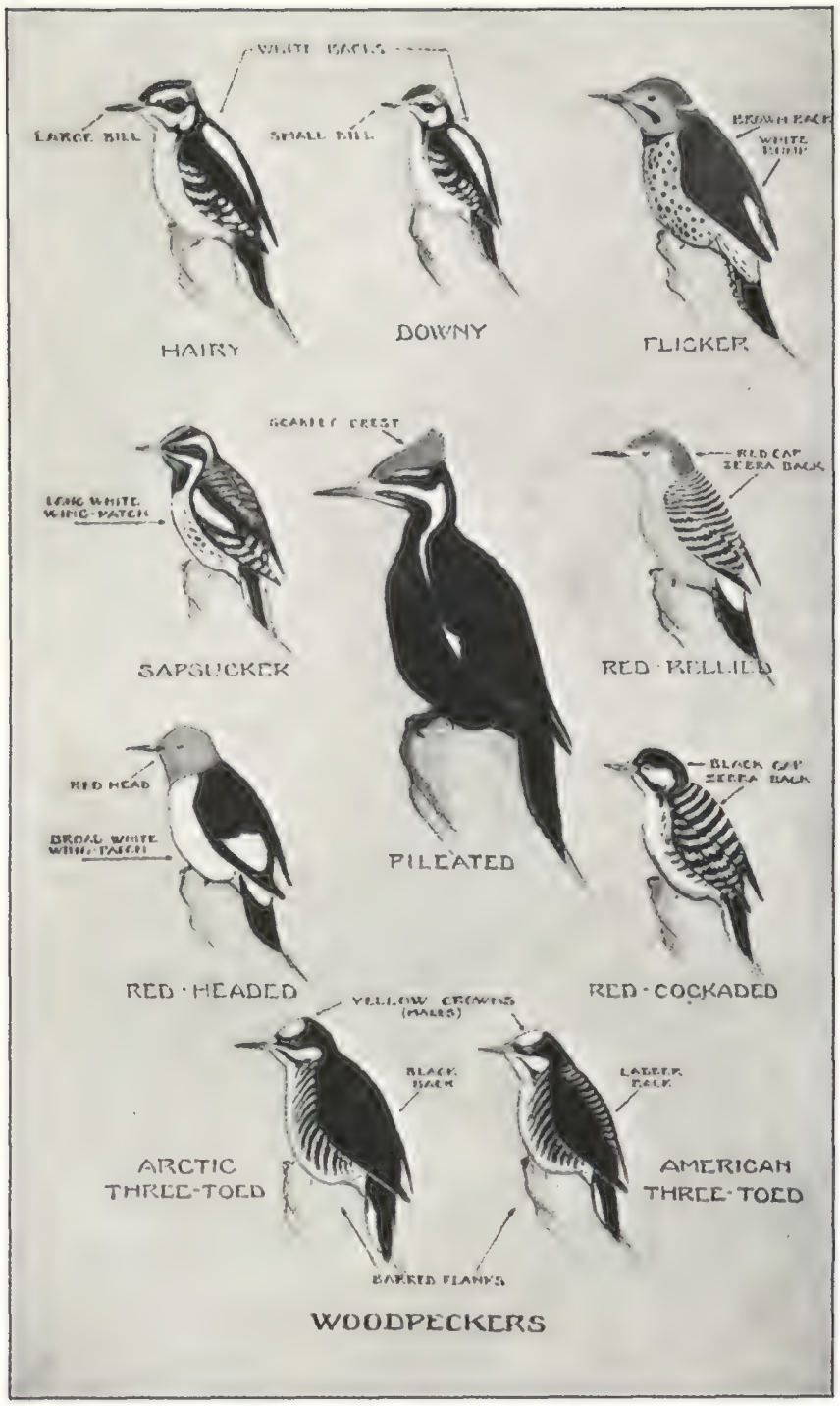
By Michael Harwood

His art and words are manna for the bird watchers

Roger Tory Peterson's 1934 Field Guide *created an army of American birders; its new 1980 edition will swell the ranks*

Several hundred thousand North Americans take bird watching seriously these days, myself included, and most of us learned to identify birds mainly from one man: Roger Tory Peterson, inventor of the modern pocket field guide.

Peterson, now 72 and white-haired but fit enough to jog in the mornings, has been painting birds and writing about birds for more than half a century, and he is still at it. This month, Houghton Mifflin will publish a fourth—and by far the best—edition of *A Field Guide to the Birds,* the classic that elevated him in 1934 to high priest of American birding. These are heady days for devout bird watchers whose bible for decades has been Peterson's *Guide,* unquestionably this century's most prestigious bird book. The current revision is the first in 33 years and brings with it more than 100 all-new color paintings, a convenient new format, the addition of extinct and exotic species, and detailed range maps.



"Patternistic" illustrations in the 1934 *Guide* emphasized birds' field marks with arrows.

More color—including this plate—was added in 1947, but descriptions of birds still did not face pictures.

On a bright morning last July at his Connecticut home, Peterson talked about the history of the *Guide:* "Prior to 1934 field birding was mostly shotgun ornithology. No one quite believed that you could tell a female Cape May warbler in the top of a tree just by using binoculars until Ludlow Griscom [who did most of his birding around Boston and New York] showed the old-timers you could. He'd say, 'That's a female Cape May,' the old-timer would raise his fowling piece, down came the bird, and it *was* a female Cape May. Griscom was our great dean of field identification, from whom most of us learned our tricks."

Most of a privileged few, that is. For everyone else who wanted to study and enjoy wild birds without shooting them, there existed no "dean"; what they needed was a handy reference book—small and light enough to carry in a pocket, simple and yet thorough—to help solve difficult problems of bird identification.

There were *big* reference works, of course, replete with detailed descriptions and illustrations. But away from such sources, most bird watchers had great difficulty remembering all the thousands of possible plumages and different call notes and songs in proper order.

As Peterson developed his skill at it, he also developed a flair for conveying identification tricks to others. One of his frequent companions afield was William Vogt—writer, editor and naturalist. "I taught him his birds and he taught me flowers. He felt that I had such an easy way of explaining things to him I should

Portraitlike paintings from the 1980 *Guide* (here much enlarged) show more detail, face the text.

WOODPECKERS

put it in book form. So first I did a few articles, which he peddled. One was in *Nature,* on gulls—it was called 'Half a Mile Away'; I did three for *Field and Stream* on identifying waterfowl. Finally I did do the book."

Although he included only eastern and central North American birds in that first *Guide,* he took three years to finish it while teaching art and natural history at a school near Boston. He now regards the effort as "crude," but it was effective. The black-and-white illustrations (only four color plates) were, as he calls them, patternistic; they reduced each species to its visible essentials and did away with potentially distracting details. The text took the same simplifying approach; in it Peterson showed a relaxed, amused chattiness, one of his trademarks ever since.

Several publishers rejected the manuscript; this was during the Depression, when a guide to bird identification may have seemed a bit extravagant. Then Houghton Mifflin saw it and decided to take a chance. The result is a legend of ornithology and publishing. The first printing of 2,000 sold out in a week. The first edition plus two revisions (in 1939 and 1947) sold more than two million copies. From this success sprang the "Peterson Field Guide" series, which now numbers 25 volumes, including western birds, birds of Texas, birds of Mexico—all by Peterson—and birds of Britain and Europe, for which he was artist and chief planner. Others range from animal tracks and birds' nests to rocks, stars and edible plants.

A Field Guide to the Birds did much more than help the already interested bird watcher. It introduced countless people to the pleasures of bird study. Suburbanites, wondering about the identity of birds in their gardens, snapped it up. Fond uncles and grandmothers recognized it as a first-rate Christmas or birthday present. Some ornithologists believe it changed the habits of certain species by inspiring a boom in winter bird feeding. This may be why, for example, cardinals and tufted titmice have spread northward in recent times.

At the very least, the *Guide* changed ornithology. In the first three editions Peterson made a slightly embarrassed bow toward scientists. As he put it in his 1947 introduction: "Field birding, as most of us engage in it, is a game. . . . Some ornithologists minimize the scientific value of this type of bird work. Truly, it has but little. Recognition is not the end and aim of ornithology, but is certainly a most fascinating diversion, and a tool which the person who desires to contribute to our knowledge of ornithology might profitably learn to master."

He eats no such humble pie in the new edition, nor should he. Amateur birders who came of age using his guides now constitute a huge army of regular observers, many of whom faithfully report what they see and provide reams of new information about the ranges, wanderings and behavior of North American birds. Birders are organized into associations, conduct and staff ornithological research projects, support publications devoted to birds and contribute heavily to bird conservation. Collectively, they spend truckloads of money each year on bird trips, equipment and books—including field guides.

Spelled generically it's a "peterson"

Competition is fierce in the field-guide market. As amateurs add to what we know about birds, and as color-printing methods improve, new guides become inevitable and essential. Peterson's early work could not satisfy everyone forever. Take me, for example. I began birding with a "peterson," the 1947 (third) edition (he suggests wryly that when we use his name generically we mean it with a small p: a peterson). I wore out one copy and almost another in 20 years; a tattered "peterson" is a badge of honor among birders. As I got better under the master's guidance, I grew critical of him; his format began to drive me crazy: the plates were separated from the written entries. When I spotted an unfamiliar bird I first had to find what I thought was the right plate and then the right text. As I went back and forth between bird on the move and birds in the book, I kept losing my place. You cannot jam three fingers as bookmarks between pages and still handle your binoculars easily. I fumbled and cussed, frantic that the bird might fly off before I found what I needed. It often did.

What I wanted was a field guide in which the text faced the pictures. In 1966 just such a guide, the *Birds of North America,* was published by Golden Press.

Michael Harwood wrote the article about the terns of Great Gull Island in the August SMITHSONIAN.

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To further meet the needs of neophyte birders who found Peterson's patternistic renderings too simple, too abstract—birds did not *look* like that—Alfred A. Knopf in 1977 published *The Audubon Society Field Guide to North American Birds* with color plates—all photographs—divided into categories of look-alikes.

Now we have the brand-new "peterson": the pictures face the appropriate text and are organized into eight "visual categories" based generally on habitat, behavior and size. The plates are new or redone; there are 136 of them—more than double the number in the last edition—and all in full color. The paintings remain simple, but Peterson admits he "compromised by leaning a bit more toward portraiture, because bird watchers are becoming more sophisticated, and they demand more detail." He shows extinct species as well as parrots, parakeets and other exotic birds that have either been introduced to the wild intentionally or are escapees from captivity likely to bewilder North American birders. He includes many "accidental" species—birds known to turn up very rarely, but on their own. In the back are 65 pages of range maps drawn by Peterson's wife, Virginia Marie.

The new format required the tightening of texts. Some "peterson" watchers will regret elimination of his pleasant discursiveness, but the chatty tone is not gone. The barn owl is a "long-legged, knock-kneed, pale, monkey-faced owl"; the flamingo's profile in flight—long neck and legs outstretched and drooping—gives "the impression that the bird might as easily fly backward as forward"; the scarlet tanager still sings like "a robin with a sore throat."

Roger Peterson shows no signs of slowing down: "I expect to live to be 110." He made all the paintings for the new *Guide* within the past three years, while also producing another book, *Penguins* (SMITHSONIAN, October 1979). During 1979 he virtually worked around the clock, but he likes that: "I tend to do my best work then. So right now I have to fight a letdown. I don't like to be in limbo at all; I want either to be kept to my work or be traveling, it's got to be one or the other." He went to China with his wife last month; soon he is off to Antarctica. Next year he plans "to work like the devil on some proper paintings" and repaint 30 plates for a revision of his European bird guide. In 1982 he is to start revising his western guide, but not from scratch: "I couldn't face it. It would take me ten years and I'll be 82 then. I've got other things I'd like to do."

And beyond *them*? Well, bird watchers are adding new discoveries at a great rate. Statuses and ranges change all the time. Field guides are vulnerable to rapid obsolescence; possibly there is a *fifth* edition of the eastern-central *Guide* in our future. By then my copy of the fourth should be as tattered as the "peterson" I had when I was first learning the birds.

Dressed in a warm-up suit, Peterson, who runs each morning to help keep himself fit, shares a seat with a sculpted penguin. He sometimes calls himself "King Penguin," after his favorite bird.

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By Kenneth Fields and Mervin Kontrovitz

An invisible art blazes into life under microscope

Using butterfly scales like paint from palette, a group of Victorian craftsmen fashioned beautiful pictures that the eye could not see

Close-up of a single flower from the work at left gives some idea of the painstaking effort involved.

As experienced microscopists we had seen many microscope slides of remarkable beauty, but never had we seen images like these: a cornucopia of flowers, bright leaves, birds in flight, butterflies! The microscope revealed a world of dazzling colors and shapes. We were mesmerized by the delicacy and fine detail. Yet all of this, the array of forms and brilliant hues, was much smaller than the head of a thumbtack. We had come upon a rare collection of antique microscope slides through the descendants of a collector.

Each slide contained a tiny picture fabricated from even smaller components. We had never seen such preparations, and in our darkened laboratory our awe gave way to a deep curiosity about the slides. Exactly how old were they? Who had prepared them? And how? We quickly contacted other microscopists at some of the leading museums in the United States, but they offered only vague recollections of having read or heard about such artistic slides. None had actually seen them. When we began to correspond with European microscopists, however, we started to learn about the slides and the preparators.

The slides were made during the middle and late 1880s for the specific purpose of enthralling collectors of microscopic objects. Long before electronic diversions were known, Victorian ladies and gentlemen would gather after dinner in plush drawing rooms. Splendid brass microscopes would be taken from their wooden cases and set up. Then would appear the slide cases of dark leather. Inside each, resting on a lining of silk and velvet, would be the slide itself, supporting a microscopic but elegant picture. This was the central attraction of the evening's entertainment.

Slide catalogs of the Victorian period offered such mounts as well as the usual scientific preparations of tissues and the like. The best decorative slides sold for as much as three pounds sterling, a high price in those days. It was in the catalogs that we learned of the names of some of the preparators, but their names revealed nothing of their techniques. As a result, we began a search through a variety of publications on microscopy. In some very old and rare journals we began to gather facts about the methods used.

A few key articles disclosed the technique, or almost all of the technique, for mounting. The preparations were the product of long planning and tedious but creative execution. After the design for a particular slide had been put in final form, the worker would gather numerous butterfly wings to insure an ample supply for all the needed colors and shapes. Even the rich variety of European species was insufficient, and so the artist used specimens from around the world.

With the butterfly wings at hand, the preparator used a delicate needle to strip off the individual scales. One by one, he placed them on black cardboard, sort-

From diatoms and butterfly scales, Harold Dalton created this still life (enlarged 40 times) a century ago.

Photographs by Phillip A. Harrington

About 700 butterfly scales form the flowers, and skeletons of diatoms the glassy base, of this cornucopia. The same image is shown at left with a paper clip, actual size. The concentric rings are the seals of the mount.

ing them by color as would a painter preparing a palette. Then carefully, again one by one, the artist selected the proper shapes and colors from the cardboard. With an ivory toothpick or a pig bristle he transferred a scale to a small round glass slide. When a scale was on the slide, it was maneuvered to its place to form the petal of a flower or the wing of a butterfly or the tail feather of a bird. In this way a picture was formed on the glass. We must keep in mind that the scales were extremely small and all of the work had to be done under a microscope or a magnifying glass.

Each scale had to be positioned exactly. Often the mounter breathed through a pipe leading to the slide. This allowed the scale to be moved easily over the moist surface of the glass. When a scale was in place, the mounter crushed one small spot against the slide, relying upon the natural oils to serve as an adhesive. Upon close examination the crushed areas can be seen on most of the scales that decorate the slides (p.111, bottom left). Occasionally, a few diatoms—the skeletons of tiny marine organisms—were added to the design for their transparent beauty. Diatom shells catch the color of nearby scales and seem to glow under the microscope.

The artists had a sense of the anatomy of animals and plants. The best imitated the forms with just a few scales. They would trim or rotate them until the correct outline and proportions were achieved. We can only guess at how long it must have taken to complete each of the slides.

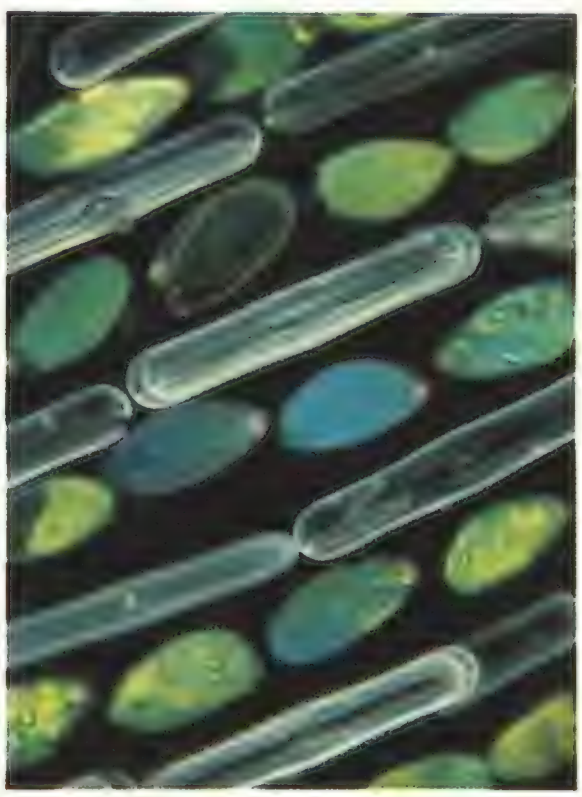
Dust always plagued the mounters. It accumulated on the slides while the scales and diatoms were being positioned. Elaborate hoods were built to enclose the hands of the artist and the microscope. Even these precautions did not prevent dust from contaminating the slides. At the end of the work, the mounter removed the dust particles with a wooden toothpick. Then he sealed the slide in a cell made with a glass disc on top and sides composed of a colored lacquer cylinder (above).

Some of the cells had black bottoms that were opaque to light. These were to be viewed in light shining from the top and reflected off the picture. Other cells were completely transparent, allowing light to pass through the picture. In transmitted light from below the picture appeared in tones of yellow, red and brown, much like the colors of leaves in the autumn. When viewed in light from above, the same picture showed dazzling, bright colors.

It is still a mystery how the objects have stayed in

Dr. Fields is a mathematician currently teaching at Rider College, New Jersey. Dr. Kontrovitz heads geosciences at Northeast Louisiana University.

Another cornucopia by Harold Dalton is remarkably intact after a century. Even then, such a slide sold for three pounds or more, a sum that put the hobby out of reach for working people of that time.



Details from scene above reveal some techniques. Flower petals at left show spots where Dalton pressed them to the glass; transparent diatom skeletons decorate horn, center; detail of horn rim is at right.

place for more than 100 years. Although the slides were sealed, it still seems likely that the butterfly scales would have dried out (in the case of the diatoms, the shells were dry in the beginning). Why do they still adhere after years of being jostled about? Mounters who allegedly revealed their secrets insisted that no additional glues or gums were used. These were so-called "dry mounts," and the scales and diatoms are still in place a hundred years later.

The men who prepared the slides were skilled microscopists. English, German and French were among the best preparators. Our own slides were inscribed with the name "Dalton." We learned that he was Henry Dalton, also known as Harry Dalton, Harold Dalton and H. Dalton. Born in England in 1829, the son of a physician, Dalton was well trained in the sciences and microscopy. When he had reached his mid-thirties he had gained a reputation among European collectors as the paramount maker of decorative slides. His work on scientific slides was also excellent, but he is most remembered for his artistry. Dalton became ill, possibly with tuberculosis, and journeyed about Europe, apparently to improve his health. His travels further enhanced the recognition of his work and today his slides are probably the most prized by modern collectors.

Although strictly a scientist, Dalton was greatly admired in his day, especially by the French. His obituary in the *Bulletin de la Société des Naturalistes Parisiens* made this clear:

"He excelled in the preparation of diatoms arranged in classified collections, and these admirable mosaics composed of butterfly scales and diatoms, to which he laughingly referred to as 'nonscientific amusements'; amusements they may be but [they] require extraordinary ability along with . . . design and color worthy of the greatest artists."

And a tribute published 21 years after his death in the *Bulletin de la Société Française de Microscopie* was equally emphatic:

"Harold Dalton was perhaps not a great scholar in the true sense of the word. He published no works and he wrote nothing new. For the French naturalists and micrographers, however, he was a prestigious craftsman whose ability is surpassed nowhere, neither in France nor abroad."

Until his death at age 82, near Paris, Dalton retained his enthusiasm for microscopy and encouraged young mounters to prepare the tiny pictures. But the Victorian age had waned. The slides were no longer popular with wealthy hobbyists.

Our inquiries indicate that today there are fewer than a dozen collectors who still search fiercely for such antique slides. Apparently the collectors of the old, decorative slides want no publicity about either themselves or the mounts. Few of the slides remain in good condition after years of handling that have broken many of the seals. When exposed to atmospheric humidity and fluctuating temperatures, the pictures deteriorate rapidly.

Perhaps the exact techniques for preparing the tiny masterpieces will never be known. Their number will continue to dwindle. Collectors will tuck away the best examples to be enjoyed by ever fewer people, and the artistry of Dalton and others will indeed be lost.

Butterfly scales were cut into feathers of flying bird. Lower bird's feet are made of hairlike scales.

Attention to detail gave realistic perspective to fern, facial expressions to the fighting bird and lizard.

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25 41

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PLYMOUTH RELIANT K

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By Robert Wernick

Medieval Conques continues its long homage to St. Foy

Tourists today are following the footsteps, if not the traditions, of pilgrims to a remote French village and its martyred little saint

Fides, or Faith, was the name of a 12-year-old girl who lived in the Roman province of Aquitania, in what is now the little French city of Agen. She was raised as a Christian, and when the soldiers of Rome one day in the year 286 demanded that she worship an image of the emperor Maximian, she refused to betray her God. They tied her to a griddle and stretched the griddle over a bonfire. An attendant angel, moved by the little girl's plight, sent down a thick cloud to cover her nakedness, and the cloud dampened the fire. Inflexible in his wickedness, the Roman officer in charge of the proceedings ordered her dragged to an executioner who chopped off her head. Pious hands collected body and head, and eventually her bones were placed in a handsome sepulcher in Agen, and pilgrims came from great distances to behold it, often being vouchsafed miraculous cures as a result.

Such was the tale which was known through all Western Christendom in the early Middle Ages. Nowhere was it listened to more avidly than at the monastery of Conques, in south central France, a hundred miles or so northeast of Agen and perched on a cliffside in a forested wilderness. This monastery had owed its foundation to a Frankish nobleman named Dadon, a brutal ruffian even by the standards of his time. But eventually a wave of shame and remorse came over his obdurate heart. He became a hermit, living on roots and berries, lacerating himself in a frenzy of penitence. His harsh repentance reached the

Clustered around the Romanesque grandeur of the Church of St. Foy is the stone and half-timbered

Photographs by Dmitri Kessel

village of Conques, a living remnant of past centuries, with a population today of about 400.

Above west portal of the church is a magnificent tympanum depicting scenes from the Last Judgment.

Detail of relief shows wicked knight whose abuse of monks supposedly led to his being sent to hell.

ears of the King of Aquitania, Louis the Pious, son of the great Charlemagne; the king came to pray with the hermit and left him money to build a monastery on the site of his rude dwelling. The king was pleased by the site, a shell-shaped ledge scooped out of the mountainside, and he named it Conques, from the Latin *concha,* meaning shell.

The monks who came to live there received many marks of favor from powerful patrons, but their monastery did not enjoy the fame they thought it deserved. Few pilgrims were willing to make the dangerous voyage there through the ravines of what was then the province of Rouergue and is now the Department of the Aveyron. Since the time of the Gauls, this has always been considered one of the most depressed regions of all France, the poorest in natural resources. Until the popularization of Roquefort cheese in the last century introduced a bit of prosperity, its history was one of periodic famine and, as a consequence,

Robert Wernick lives in France and has written frequently for SMITHSONIAN, *most recently on the Whitney Museum in the August 1980 issue.*

of emigration to more favorable economic climates.

What was needed, the monks reasoned, was something both physical and sacred, a material manifestation of holiness. An idea took root. They sent a young smooth-talking brother named Ariviscus to join the monastery of Agen. He stayed there ten years and so gained the confidence of his superiors with his piety and zeal that they appointed him guardian of the tomb of St. Fides, her name now Gallicized to Foy (*foi*). That night, when all the others were asleep or at prayer, so the story goes, he broke open the tomb, scooped up the bones of the saint, and fled over the hills to Conques.

The monks of Conques were proud of his exploit, and wrote accounts, both in verse and in prose, of what they called the Furtive Translation of the holy relics. It may sound shockingly larcenous to modern ears. But the monks, in their hardheaded medieval way, regarded it as an act of piety. If St. Foy, they reasoned, had not wanted her bones removed, she would have stopped Ariviscus dead in his tracks.

Miracles from a playful saint

Miracles began to happen. St. Foy restored sight to the blind. She listened to the prayers of poor Christians who had been held as slaves in Spain. When they acquired their freedom they came to lay their chains at her feet—immense heaps of iron which the monks later melted down and fashioned into the ornamental grilles that close off the chapels of the church to this day. She played girlish tricks as well, as when she woke up the old night watchman to tell him the lamp had gone out by her shrine. After he had dragged his arthritic old bones over the stone floor he found that she had relit the lamp herself.

Stories like this brought pilgrims to Conques, thousands of pilgrims, many of them bearing rich gifts for the saint. The monks decided that her bones needed to be properly housed, and they would make a reliquary statue to contain them. The 33-inch statue, called the Majesty of St. Foy, which the monks now produced in their workshops, was the extraordinary object illustrated on page 125: wood encased in gold, sparkling with a dazzling profusion of jewels, stiff, oddly shaped and oddly proportioned, with great staring eyes of blue-black enamel, totally hypnotic to pilgrims come to contemplate it.

Centuries later scholars argued over the nature of this work. For some it was a pagan idol redecorated to serve as a Christian saint. For others it was a purely Christian work. In 1954 a team of experts under the direction of Jean Taralon, now the head of Monuments Historiques de France, took the Majesty apart and studied it in detail over the better part of two

In tympanum detail, Virgin Mary leads procession to throne of Christ. Figure at left may be Charlemagne.

Harmoniously ordered capital shows musicians and a fanciful acrobat, participants in medieval life.

Complexity and fine craft of the frieze is displayed in carving of devil, the damned and the jaws of hell.

years. They concluded that the Majesty was a combination of the long-dead Roman and the burgeoning medieval art.

The torso of the statue, they found, was made of two blocks of yew wood, very roughly chiseled—journeyman carpenter work. Over this a skilled goldsmith had placed a gold repoussé case worked into highly sophisticated designs. Then a fourth- or fifth-century Roman head, perhaps a mask or the portrait bust of an emperor, was joined to the saint's torso. To the medieval artist, incorporating a pagan work of art into a Christian sacred object was not unusual. No matter that the head was too big for the body, or that the neck reared back at an unnatural angle. They were not interested in representing the little girl who had been martyrized. They wanted a statue of the saint, triumphant in heaven, ready to grant favors to her supplicants. The fierce eyes and the jutting jaw were to them marks of power and glory, just as they had been to the fourth- or fifth-century sculptor who first fashioned them.

The original Roman head had worn a wreath of laurel. The monks removed this and replaced it with a gold crown. They seated this composite figure on a gold throne, and over the centuries it was repeatedly repaired, reconstructed, redecorated. The quadrifoliate window in the stomach, which allowed the faithful to see the skull of the saint, was carved in the 14th century. The outstretched arms with hands holding little tubes for flowers or palm leaves were added in the 15th century; the shoes not until the 19th century.

And all the while, century after century, pilgrims added their private treasures to the glory of the saint: earrings, necklaces, bracelets, pieces of rock crystal, cameos of Roman emperors, gems of all kinds—sapphires, rubies, emeralds, carnelian, jasper.

Hexagonal reliquary of wood is covered with gilded silver, parts of which date back to eighth century.

An extraordinary treasure grew up around the statue of the saint. A magnificently crafted Saracen saddle was fitted whole into the decoration of a large silver cross. There were reliquaries for other bones, or for splinters of the True Cross or other treasures of doubtful authenticity: the skull of the prophet Habakkuk, three hairs of the Virgin Mary, the umbilical cord and foreskin of the child Jesus. Legends were embroidered to fit all of them. A triangular reliquary was said to have formed part of a letter "A" (opposite); this in turn was said to be the first in a series in the shape of all the letters of the alphabet from Alpha to Omega which Charlemagne ordered for the most worthy monasteries of his kingdom, Conques getting the pride of first place. The Charlemagne story is probably an invention, but it was true that only kings or princes could have afforded these magnificent gifts to the saint. The skull of St. Foy was wrapped in Byzantine silk colored with the rare and expensive purple dye reserved for the use of imperial families.

The great days of St. Foy and of Conques came in the 11th and 12th centuries, when interminable files

A reliquary forming part of letter A, of wood and gilded silver, is richly decorated with cabochon gems.

A golden, bejeweled reliquary is supposedly a gift of Charlemagne's father—or of one of his grandsons.

of pilgrims used to tramp across France on their way to the tomb of the apostle James at the church of Santiago de Compostela in Spain. The hardest and stoniest, and therefore the most popular, of the pilgrim routes led through Conques. There the footsore pilgrims would halt to drink from the spring which gushed from under the church—a 12th-century guidebook says that no one can praise this water highly enough—and there the image of the saint would be borne triumphantly through the crowd amid the ringing of bells, the blaring of trumpets and the frenzies of mass devotion.

To accommodate the increasing crowds, the monks tore down their old low-ceilinged church early in the 11th century and built another, in the new awesome Romanesque style. (Construction proceeded slowly and was not completed until about 1130.) Working on a narrow ledge, they were cramped for space, but what they had to sacrifice on the ground they made up for in height: the vaults of the nave soar to more than 72 feet. Conques was one of the five most important pilgrimage churches, built to receive great crowds and processions.

Sculpture on medieval churches was meant to be a permanent sermon in stone, spelling out for frequently illiterate pilgrims the teachings of the church. The sculpture at Conques has been amazingly well preserved. The combination of a fairly mild climate and the sheer isolation of the spot has protected it. The church itself is surprisingly complete and relatively intact. The ensemble of 124 figures on the tympanum over the west door—some of them still bearing blue and ochre traces of the polychrome decoration which once covered them (top, p. 119)—remains almost unchanged.

The capitals of the columns inside the church trace the history of sculpture in France during the late 11th and early 12th centuries and, testifying to the vast creative imagination of the medieval artist, include abstract geometric and foliate designs as well as animated renditions of monstrous animals and the human figure in action.

Medieval sculpture tended toward the ideal and the generalized. It usually preferred images of sin or sanctity to portraits of any particular sinner or saint. The sculptors at Conques were passionately earthy and

Strength, coherent design and straightforwardness of medieval craftsman are evident in capital carving.

realistic. They loved the details of life around them, and whether creating angels or fabulous monsters or scenes from the daily round of existence, they were capable of amazingly lifelike effects. When two warriors smote each other with their huge swords as they frequently did, according to the customs of the time, you can almost hear the clash of steel.

When the itinerant sculptors came to creating the figures that would populate heaven and hell on the tympanum, they drew inspiration from a variety of influences from the past—Carolingian, Roman, Byzantine and even Greek. Many of the faces, however, have a startlingly familiar look to anyone who has wandered around Paris. There is a simple explanation. The population of the Aveyron has been remarkably homogeneous since prehistoric times, because few were ever tempted to move into this inhospitable region. Hundreds of Aveyronnais peasants, fleeing the wretched life of rural poverty, came to Paris in the last century and opened shops selling coal, wood and alcoholic beverages. The coal and wood trade has languished, but the drinks still flow. Enter a traditional-looking bistro in almost any quarter of Paris; chances are you will see leaning over the counter a shrewd, work-lined, immensely practical Aveyronnais face that might have come right off the stones of the church at Conques.

Some of the episodes that could have inspired scenes on the tympanum may have been recorded in old chronicles. When the sculptors wanted to show Pride riding to a fall, their thoughts might have turned to the familiar figure of Rainon, a local baron and great villain, who was riding full tilt to knock down an inoffensive monk when his horse stumbled. Rainon broke his neck. Is it Rainon who appears for the rest of time on the right side of the tympanum, among the damned, falling like an enormous worm in chain mail from his horse into the fires of hell (p. 118)?

Above him there is a devil gathering up a group of tonsured figures in a net. Everyone at Conques thought they could recognize in these figures portraits of Bishop Bégon of Clermont and his nephews, who in the tenth century had shamelessly plundered the treasures of the church.

Paradise is generally less interesting than hell in works of art. But even here, in the faces of the elect, the sculptors have added a certain spice out of their own irrepressible verve. One is most likely Charlemagne the emperor (p. 119), being led uneasily into heaven by some supremely confident monks. There is a woman beside him. She has been identified as his sister, with whom he was supposed to have committed incest. It was a way of reminding the powerful of the Earth that one manner of acquiring salvation was generosity to monks like those of Conques.

Treasures preserved by guile

There are fashions in pilgrimages as in everything else, and the vogue of Santiago de Compostela gradually faded. Conques complaisantly went back to being a little village on the verge of nowhere, a fading monument in the wilderness.

The treasures of Saint Foy remained. However, gold and silver and jewels and such treasures have always been irresistibly alluring to kings and conquerors and thieves in the night. It took guile and foresight and an abiding faith to keep those treasures intact down to our own day.

They somehow survived the Hundred Years War, when the land was periodically ravaged by pitiless bands of Englishmen and brigands. They survived the wars of religion of the 16th century, when the Huguenots were destroying churches out of a zeal for religious purity. They set fire to the church at Conques and would have hammered its treasures to bits in their fanatic rage if the monks had not taken the precaution of hiding them under stones in the church floor. (Some were so well hidden that they were not found again un-

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Brandy of Napoleon
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COURVOISIER VSOP. THE BRANDY OF NAPOLEON

til workmen making repairs stumbled upon them 300 years later, in 1875.)

They were again in mortal danger during the French Revolution. The revolutionaries regarded statues, caskets and such as relics of ancient superstition; they loved to chop off the heads of stone kings, and besides they had an appetite for gold and silver to pay for their wars. One day in 1792 the people of Conques heard a report that the authorities in Rodez were coming up to make an inventory. Knowing what that meant, they disguised themselves as bandits, broke into the church at midnight and carried off everything of value. When the soldiers arrived from Rodez they were sent off on a wild-goose chase after the robbers. Meanwhile the treasure was divided up among trustworthy families. Some objects were walled up in chimneys, some were buried in vegetable gardens where they suffered badly from the damp. The Majesty of St. Foy was tucked away in a cellar.

All remained hidden for 40 years, the secret of the hiding places being handed from father to son, and no word of it ever reached the outside world. By the time of the next revolution, in 1830, there were no monks left in Conques, not even a priest, and the church itself had lost most of its roof and was piled with debris. The French government proposed to tear it down as a measure of public safety. By rare good fortune, the inspector they sent to the spot was the young novelist Prosper Mérimée (author of *Carmen*). He made a slow and exceedingly painful journey over the roadless mountains and was overwhelmed when he found "such riches in such a desert." On his recommendation, the government decided to restore the church instead of destroying it. It was over-restored to some extent—the two towers on the west front are the work of a 19th-century architect and add a needless heaviness to the whole—but at least it was saved. Once they saw that the government no longer intended to loot the church, the townsfolk brought back the hidden relics into the open air.

Nothing much has happened in Conques since then. A lovely little village suspended in time, a genuine relic of ancient days, it is inhabited today, like most remote villages in France, by a handful of elderly and retired people. The monastic community which once numbered more than 1,000 souls has shrunk to three brothers of the Order of the Prémontrés who guide the busloads of tourists through the dark underground room where the Majesty of St. Foy and all the other treasures are now kept in glass cases with electronic burglar alarms. Aside from such visitations, a deep sleep has fallen on the ancient shrine.

It has become something of a tourist attraction in recent years, and in summer its narrow cobblestoned streets are full to bursting. But the tourists have to leave in the evening because there is only one hotel in town and a wise government policy permits no new building nor any change in the local architecture. The streets empty out then, and as the dying sun lights the dark tile roofs of the village clustered around the tawny limestone and pink sandstone of the church, it takes little effort of the imagination to move backward a millennium in time. And while the great bell in its tower booms out the call to evening prayers, to envision the scene with a mass of weary pilgrims shuffling over the mountains to venerate the little saint with her triumphant imperial eyes.

Stillness of the ages pervades the little village as one of its residents walks past the church, at left.

Bejewelled and encased in gold, the Majesty of St. Foy contains the skull of the martyred saint.

This Tenneco drilling rig made a significant discovery of oil and natural gas on Sabine Pass Block 13 off the Texas-Louisiana coast in the Gulf of Mexico.

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Aldo Leopold used his farm as a natural laboratory; here he has woodcock in hand and scales before him.

By Bil Gilbert

'Sand County' farm shaped new ethic for the environment

On the land of pioneer ecologist Aldo Leopold, the woods, marshes and meadows still teach those lessons that he expressed in his Almanac

Sunrise at the Leopold Reserve illuminates wet prairie and marsh, with corder grass in the foreground

Paddling or floating in a canoe down a river has always seemed like one of the best things there is to do. I have had a good many opportunities—or at least excuses—for doing so, traveling rivers from the tundra to the jungle. I have never met one I did not like, but one of the best for me has been the West Branch of the Susquehanna, which flows eastward out of the highlands of western Pennsylvania.

The West Branch is not a ferocious white-water stream, but it moves along briskly through an almost continuous series of riffles and small rapids which make for sporty and easy going. Purists would not classify this as a wilderness river, but the upper West Branch does flow through a narrow, largely roadless valley/canyon in which the native flora and fauna of the central Appalachians flourish in abundance and variety. Beyond or underlying these tangible attractions, there is an important intangible one: the memory of how badly abused this river was only a quarter of a century ago. I think there is no better

and aspen grove at left. Leopold often began his days here at crack of dawn, with notebook and mug of coffee.

place to observe the benign influence of what has come to be called the environmental movement, or to contemplate some of the better sides, or at least possibilities, of human nature.

For these reasons, on the West Branch I have often thought of a man named Aldo Leopold. So far as I know, he never saw this river and he died in 1948, long before its recovery had commenced or was even being actively considered. Nevertheless, I think he was and remains importantly involved in the happenings there and in a good many other places, because he so significantly contributed to the raising of the general level of consciousness in regard to these matters.

Twenty-five years ago the West Branch valley—above flood stage—was approximately the same as it is now, but the river itself was in terrible condition. It smelled bad, tasted bad and burned the eyes. It was of a diseased yellow color and the water stained everything it touched the same color: rocks, logs, mud and sandbars, even canoe paddles. In it was considerable raw

Color photographs by Robert Frerck

sewage and miscellaneous pollutants from riverside communities, farms and industries. The worst problem, and the one which, among other things, caused the garish discoloration, was that much of the water had, before reaching the main river, seeped through and steeped in deposits of sulfur exposed in abandoned coal mines. In consequence it was highly acid. For miles not a fish, crawdad or sweet aquatic plant could live in it. Most of the plants, insects, reptiles, birds and mammals which formerly had used the shallows and banks used them gingerly or not at all.

In the late 1950s the West Branch was very nearly a dead river, but since then it has slowly returned to life. This return has been a fascinating and moving thing to watch, like the comeback of an apparently badly beaten fighter. There has been no single Lazarus moment, but rather a slow, often almost-imperceptible reappearance of vital signs and functions: ferns and grasses pushing down toward the river and patches of aquatics establishing themselves in it; salamander and frog egg masses in a backwater; raccoon and sandpiper tracks in the mud flats; the replacement of yellow stains on rocks with periwinkles; suckers, dace and bass moving upstream.

The tenacity of a great many species has contributed to the resurrection of the West Branch, but it is coming back largely because of things our species has done and is doing—or, more accurately, has stopped doing. We have closed down many former sources of pollution—most notably the flow of acid water out of many old mines—and are creating new ones far less often than we did a quarter of a century ago. The improvements do not follow any one dramatic, Save-the-Redwoods, Protect-the-Whooping-Crane type of campaign, but rather a steady accretion of new local, state and federal regulations, appropriations, subsidies, injunctions, voluntary and coerced actions. The changes occurred when and as they did (the techniques and resources for such restoration were already generally available) because there was an obvious shift in public opinion that encouraged and supported them. The conviction grew that a filthy, dying river was bad for business, recreation and health. There was also a sense of another sort of judgment—essentially a moral one—that killing a river is a disreputable act, while trying to restore it is an admirable one.

During the past decade or so there have been situations elsewhere, comparable to that on the West Branch, in which there is evidence that a new sort of environmental ethic is a factor influencing public and private behavior. If so, it may well be that years hence, when the who-struck-Johns of our hot controversies about the Alaska pipeline, catalytic converters and snail darters are of interest chiefly to archivists, the creation or recognition of this type of conscience will be remembered as the most important environmental accomplishment of our time—the one that made the rest possible.

Although others have made the claim for him, Aldo Leopold was too sensible a man himself to claim that he was the creator or author of an environmental ethic. "Nothing so important as an ethic is ever 'written'," he said. However, with great insight, he persuasively described the origins of such a code of behavior and the need for it:

Current Fellows Scott Freeman, Susan Leopold (with guitar) and a friend cook over pit by the Shack.

Bil Gilbert is a contributing writer for Sports Illustrated. *He lives in Fairfield, Pennsylvania, not far from the West Branch of the Susquehanna.*

"An ethic, ecologically, is a limitation on freedom of action in the struggle for existence. An ethic, philosophically, is a differentiation of social from anti-social conduct. . . . The first ethics dealt with the relation between individuals. . . . Later accretions dealt with the relation between individual and society. . . . There is as yet no ethic relating to man's relation to land and to the animals and plants which grow upon it. . . . The extension of ethics to this third element in human environment is, if I read the evidence correctly, an evolutionary possibility and ecological necessity. It is the third step in a sequence."

Born in 1887, Leopold was a pioneer ecologist, a professor of wildlife management at the University of Wisconsin, and one of the founders of this discipline and vocation. However, he was not widely known outside the profession until the publication, in 1949, of his book, *A Sand County Almanac and Sketches Here and There*. Ironically, the manuscript—which had been rejected elsewhere—was accepted for publication by the Oxford University Press only a week before Leopold died, after suffering a heart attack while fighting a brush fire in April 1948.

The volume is a collection of essays about a poor, sandy farm he owned in southern Wisconsin, his travels in western North America and the environmental philosophy which developed out of these experiences and observations. Since its publication, the *Almanac* has come to be regarded as a 20th-century *Walden*—or more. (Leopold was "both a better writer and a better naturalist than Thoreau," wrote one prominent critic, Sterling North; it is a judgment which many share.)

Aldo's daughter Nina and her niece Susan Leopold examine recently planted Purple Coneflower.

Collection of the University of Wisconsin-Madison Archives

Photograph from early 1940s shows Aldo and Estella Leopold on bench he wrote of, in front of the Shack.

Currently, the book is used in dozens of universities as a text and reader for students of natural history, philosophy and literature. Almost a million copies have been sold.

A Sand County Almanac was first recommended to me some 20 years ago by a better-read friend. A first reaction was that Leopold is one of those rare authors who becomes a companion to think with, if not technically talk to, while walking along, kneeling in a canoe or leaning against a log. There was a great sense of his saying silently, "I had this experience I always thought was interesting and instructive," and then describing something that would make me say, "I saw something almost like that but I never thought of it in that way before."

Once at dawn, for example, after a cold camp, I was thrashing around deep in the Sierra Madre of the Mexican state of Oaxaca, if not lost at least considerably confused. Suddenly a screaming flock of parrots exploded out of a piñon grove and wheeled through the mists across the rim of the rising sun. Ever since, I have remembered it as a beautiful and exotic moment which in an inexpressible way summarized that entire place and experience. While traveling in the Sierra Madre of Chihuahua, Leopold had had a similar encounter with parrots, one that also moved him, but for reasons that he could express brilliantly. He wrote that there is a *numenon*, the imponderable essence of material things, without which they are greatly diminished. It is distinct from the *phenome-*

Bracket fungi thrive at base of tree in the woodland Leopold astutely worked over for ecological insights.

non, which is materially ponderable and predictable. "The grouse is the numenon of the northwoods, the blue jay of the hickory groves, the whisky-jack of the muskegs, the piñonero of the juniper foothills. Ornithological texts do not record these facts. I suppose they are new to science, however obvious to the discerning scientist. Be that as it may, I here record the discovery of the numenon of the Sierra Madre: the Thick-billed Parrot."

Environmentalists as a class tend to be wordy and have produced, at the very least, a large volume of literature. Unfortunately much of it has been shrill and self-righteous in tone, deductive and abstract in style, more polemical than persuasive or memorable. Leopold is an outstanding exception, obviously caring as much for the language as he did for the natural world, and possessing the ability of a classic essayist to get at the general through the particular and to build toward the subtle from the simple. "There are," he began the *Almanac* in this fashion, "some who can live without wild things, and some who cannot. These essays are the delights and dilemmas of one who cannot."

When I first read it, I thought this was a fine, clear, provocative opening paragraph, as was most of the book which followed. I still do. So, when an opportunity came to visit the Wisconsin sand country which was, so to speak, the numenon of the *Almanac,* I was grateful for it.

The Shack: celebrated chicken coop

In 1935, when Leopold bought the first 80 acres of his farm along a Wisconsin riverbank, it was eroded and exhausted, having been cut and burned over, overworked by a series of previous owners, the last of whom, a farmer-bootlegger, set fire to the ramshackle farmhouse in a fit of pique at the hardscrabble place. The only remaining structure was a henhouse which Leopold converted into a rough cabin. As "the Shack," it figured prominently in many of the published musings about the farm and became perhaps our most nationally famous chicken coop. It was added to the National Register of Historic Places in 1978.

The farm was a family retreat, but Leopold used it most regularly. "We would come and go," says Nina Leopold Bradley, one of his five children, "and there were times as teen-agers when some of us always found the bright lights of Madison attractive. Dad was glad when we wanted to be at the farm, but never seemed hurt if we didn't. It was the same with his interests. He would share them if we were curious but they were never pushed on us. Obviously, as time went on, those interests and this place came to have an increasing influence on us."

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Along a path from the river to the Shack, a thicket of unmanaged woodland was observed from bench.

Obviously. There are few families who have followed so closely and successfully in the footsteps of a famous parent. Each of the young Leopolds became a natural scientist, and three have been elected to the National Academy. Starker, a zoologist, and Luna, a geologist, are both professors at the University of California, Berkeley, while Carl, Estella and Nina are botanists of one specialty or another. The Leopolds have also had considerable influence on a number of public policies and programs, and as a clan achieved a unique status in the environmental establishment.

Following Aldo Leopold's death, the family retained ownership of the farm. In 1968, under the persuasive urging of an admirer of Leopold's, Reed Coleman of the L. R. Head Foundation in Madison, adjacent landowners cooperated to establish the 1,200-acre Leopold Memorial Reserve. Nina Bradley and her husband, Charles, a retired geologist, are permanent residents, having built a home about a mile away from the Shack. Among other things, they oversee the work of the Leopold Fellows, three or four of whom are selected each summer to live and study at the Reserve. Their work is supported by the Head Foundation's Leopold Fund, and thus far has consisted principally of making an ecological survey of the area and recording the effects of conservative land use.

The Reserve is in a zone where for millennia the prairie and northern woodlands have contended for dominance. (The tension zone between these two biotic communities, the temporary advances of one or the other, the effects of the elements and human activities on the wavering balance between them, fascinated Leopold.) Here, at the Bradleys' request, the place will be no more specifically located.

This sort of request can be awkward to make, but it is related to a fundamental problem of land use which Leopold raised and we have yet to resolve or have even shown much desire to face squarely. It is this: if we accept the proposition that other species, communities and the land itself have natural rights, and it seems desirable to behave toward them in an ethical way, then there are times when we must place restraints on our activities, even such seemingly innocuous ones as recreation. He was not, of course, thinking of his own memorial Reserve, but Leopold had in mind the sort of problems his daughter and son-in-law are now facing when he wrote: "It is clear without further discussion that mass-use involves a direct dilution of the opportunity for solitude; that when we speak of roads, campgrounds, trails, and toilets as 'development' of recreational resources, we speak falsely in respect of this component. Such accommodations for the crowd are not developing (in the sense of adding or creating) anything. On the contrary, they are merely water poured into the already-thin soup."

"We have many requests to visit," says Nina Bradley. "Most of the people are genuinely interested. The fact that they took the trouble to make the request is evidence of interest. What alarms us is that if the farm site is publicized or located on road maps, there will be a lot of casual visitors who will want to stop by to pass an hour or so. We could accommodate the public—provide parking, trash disposal and sanitary facilities and the rest—only by converting part of the land for their use, by exploiting it. The whole point here is to maintain a place where the rights of the land are preeminent.

A landscape of cerebral attractions

"There are really no attractions here," she concludes gently, "no geysers, canyons or breathtaking views. This is just old farmland restoring itself. To the extent anything is happening, it is an ecological process which at any given moment is invisible."

This is an accurate description, the attractions of the place being more cerebral than sensual. From the Shack a footpath, following deer trails, crosses a sandy ridge, skirts the river, cutting through heavy thickets and boggy spots. Along it are some good places for watching muskrats and hearing pileated woodpeckers, but no scenic or biotic spectaculars suitable for postcard photographs. The mixed deciduous woods are not majestic but rather crowded and tangled. In them a whole lot of species of flora and fauna are obviously competing vigorously and surviving modestly. Whole

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Stand of pines near the Shack was favored by Leopold,
who said that when a choice arose between cutting

a white pine or red birch, he always cut the birch.
He used land conservatively, but not as a wilderness.

may be the key word, as wholesome is the pervading sense of the Reserve. An overt sign of this is an abundance of twisted, stunted, fallen, dying and dead trees of a sort that, paradoxically, a professional forester intent on managing land so as to produce a lot of a few things—say saw logs or deer—would find objectionable. They indicate that diverse life cycles are proceeding at their own pace. The rot eating away at oak wood around a hole drilled by a woodpecker can create a cavity suitable for a raccoon den. In time it may fell the oak. When the tree comes down, it will clear away smaller ones and some of the understory, promoting the growth of deer browse and, among other sunlight-loving things, oak seedlings.

Breakfast before ethics

It is hard in these woods to come by original insights, since they were worked over so carefully by our most astute ecological observer. "Soon after I bought these woods a decade ago, I realized that I had bought almost as many tree diseases as I had trees," Aldo Leopold remarked 35 years ago. "But it soon became clear that these same diseases made my woodlot a mighty fortress, unequaled in the whole country."

An objection to Leopold's work has been that while it may be possible and instructive for a moderately affluent, erudite professor to sit in his fortress and watch wood rot while evolving the concept of a land ethic, to a working forester or farmer trying to make a living the idea of voluntary restraint on his land use is anathema. To a resident of the Bronx it has no meaning, and to a starving citizen of Somalia it is too late.

"Yes, I know of that sort of criticism," says Nina Bradley, who has some of her father's epigrammatic style, "but Dad always said that land ethic came after breakfast."

Preeminently among our environmental philosophers, Leopold was a humanist who did not forget or find reprehensible that before thinking about grouse and parrots our species will and must think about breakfast and a good many other phenomenal needs. He did not preach that ecological hellfire and doomsday disaster would consume us if we did not immediately mend our ways. Rather, he recommended an ideal which might be beneficially pursued.

Leopold was not a primitivist and probably would have had little patience with current fads which suggest that the environmental hope of mankind is to support itself by digging roots, the light manufacture of turquoise jewelry and heavy meditation. He obviously thought highly of wilderness, but also of using the land well, an act which he descriptively called husbandry. Husbandry involves recognizing, to the

extent we can, how the natural system functions and then working with rather than against it. He did not consider technology evil, but opposed the inclination to seek technological solutions for all our problems. To exhaust a piece of land and then attempt to keep it in production with intensive use of machines and energy did not seem to him to be either ethical or in anyone's true self-interest.

After it was acquired by Leopold, the "Sand County" farm was managed to be, if not wilderness, at least a tract on which the self-healing properties and natural vitality of the land were demonstrated. ("In many cases we literally do not know how good a performance to expect of healthy land unless we have a wild area for comparison with sick ones.") However, land rehabilitation and husbandry—gardening, hunting, woodcutting—was and still is practiced there. Every so often Leopold gingerly and introspectively asserted himself in relation to the land. ("Where a white pine and a red birch are crowding each other I have an *a priori* bias; I always cut the birch to favor the pine.") Why? He suggested one reason: on his farm pine was much scarcer than birch. (". . . perhaps my bias is for the underdog. But what would I do if my farm were further north, where pine is abundant and red birch is scarce. I confess I don't know. My farm is here.")

Such matters had been under discussion one cool, wet, early summer evening as we sat by a fire pit in front of the Shack, which is still used recreationally by Bradleys and visiting Leopolds, and as a bunkhouse by the Leopold Fellows. While we talked we waited for venison steaks, given up by a local deer, to broil on a fire of oak which had been cut an hour before from a windfall with a bucksaw which Aldo Leopold had used to make a lot of firewood. By and by, these acts of husbandry were satisfyingly rewarded. Before the social part of the evening ended, I asked if I might have the key to the Shack so as to use it at dawn the next day. Nina Bradley said she thought that was a nice idea. It was also, of course, a sentimental one.

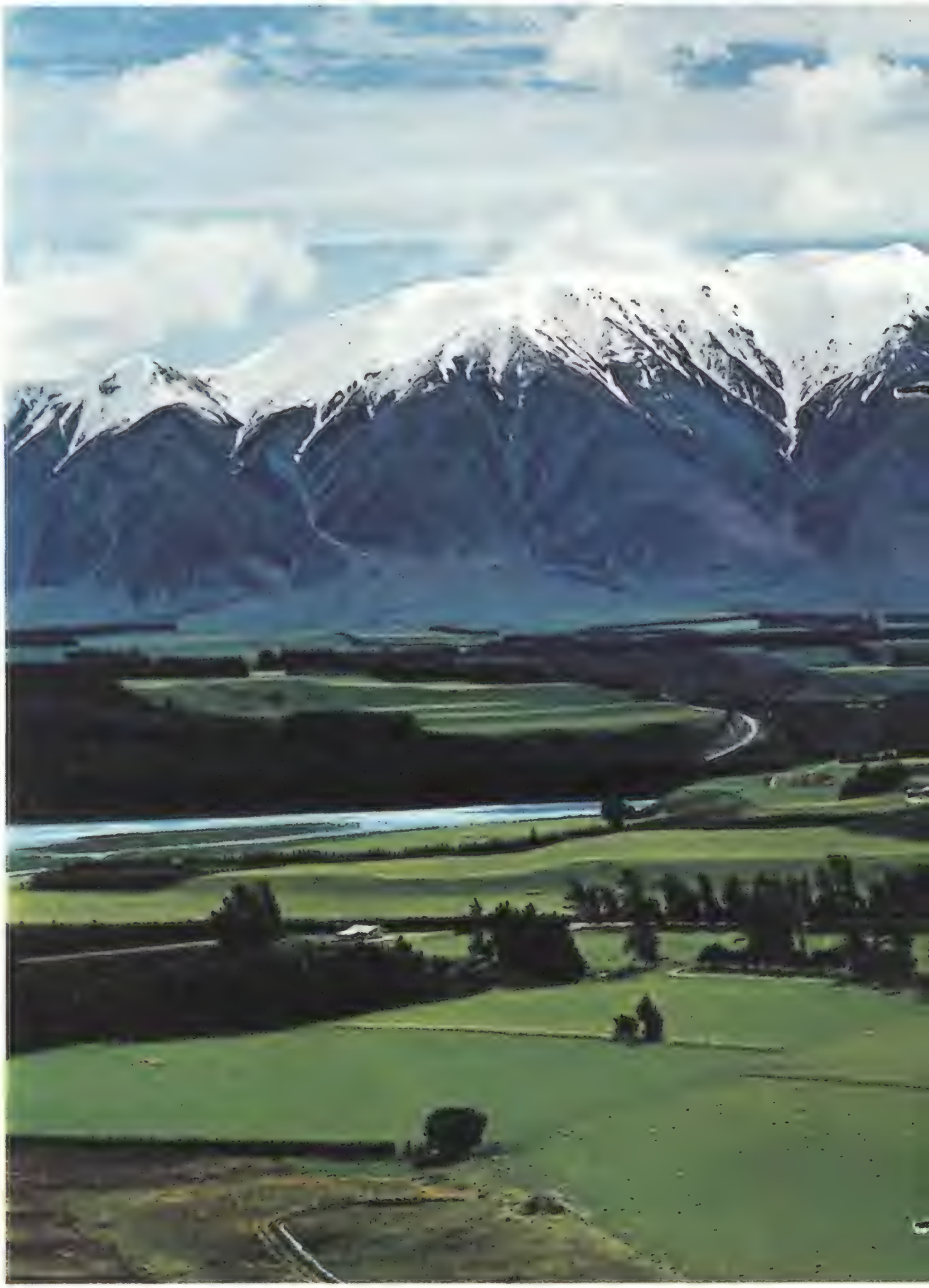
Leopold's days began at 3:30 A.M. One morning, he noted, having risen "with such dignity as I can muster of a July morning, I step from my cabin door, bearing in either hand my emblems of sovereignty, a coffeepot and notebook. I seat myself on a bench, facing the white wake of the morning star. I set the pot beside me. I extract a cup from my shirt front. . . . I get out my watch, pour coffee and lay notebook on knee. This is the cue for proclamations to begin."

The proclamations were songs offered by birds, some of the tenants of the farm, and Leopold recorded them in the order of hearing them. The first, at 3:35, was a field sparrow. Having intentionally arranged myself in similar fashion, but coming along half an hour and 40 years or so later, it seemed to me the first proclamation was issued by a house wren. Thereafter I did not keep up the ornithological log as Leopold had. Initially three deer browsing at the edge of the clearing, just visible in the early mists, distracted me. Then I began to think about the West Branch of the Susquehanna where I had often thought about Leopold and the "Sand County" farm.

On table in the Shack are Aldo's coffeepot, a spray of native prairie flowers, student's copy of *Almanac*.

Rower on river near farm at sunset evokes Leopold ideal of land that is used—but not abused—by Man.

The South Pacific. Walk a glacier.



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Run the rapids. Talk to a penguin.

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8	1	Cincinnati Symphony Orchestra
6	2	The Cleveland Orchestra
6	2	Dallas Symphony
6	3	Denver Symphony Orchestra
7	2	Detroit Symphony Orchestra
4	0	Hartford Symphony Orchestra
8	0	Houston Symphony Orchestra
7	1	Indianapolis Symphony Orchestra
10	1	Los Angeles Philharmonic Association
7	2	The Milwaukee Symphony Orchestra
5	2	Minnesota Orchestra
2	4	New Orleans Symphony
7	1	New York Philharmonic
5	0	The Oklahoma Symphony Orchestra
8	0	The Philadelphia Orchestra
9	0	Pittsburgh Symphony Orchestra
4	1	Phoenix Symphony Orchestra
7	1	St. Louis Symphony Orchestra
7	0	San Francisco Symphony Association
5	1	The Toledo Symphony
3	0	The Tulsa Philharmonic
5	1	National Symphony of Washington D.C.

(Piano choice of soloists scheduled to perform during the 1980-81 season.)

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Israeli research pond at Ein Bokek covers 70,000 square feet, is largest solar pond in existence.

The pipe in foreground delivers hot brine to an evaporator; mesh on water's surface is a windbreak.

By Wilson Clark

Take sun and salt, add some water– the result is energy

In Israel, engineers simmer briny ponds until their heat drives electrical generators; the idea will soon get a tryout in the U.S.

One unusually warm day last winter I drove from Tel Aviv to see a pond at Ein Bokek on the Dead Sea. With me was Lucien Bronicki, an Israeli engineer who has devoted his life to using sunlight for other purposes than sunbathing. "As a kid," he says, "it almost physically hurt me to see a piece of coal being burned. I was determined then to work on solar energy, and save valuable things like coal for chemical use."

Today, 25 years after he began his solar work under Harry Tabor, director of the National Physical Laboratory in Jerusalem, Bronicki's determination has paid off. He has pioneered a simple technique to extract energy from small bodies of salt water. The technique is producing electricity well in Israel—at the Ein Bokek pond I visited with Bronicki, for example—and is about to be tried in the western United States. As a sort of bonus, it offers a way of reducing salinity of water where that is a problem, as it is with the Colorado River and the Salton Sea in California.

Solar salt ponds, as they are known, are not to be confused with solar ponds, which simply collect and store the sun's energy for space heating. Salt ponds

Photographs by Robin Moyer

Israeli engineer Lucien Bronicki acted on childhood interest, began his solar research 25 years ago. After establishing his business in 1964, he developed the closed-cycle vapor turbine for solar use.

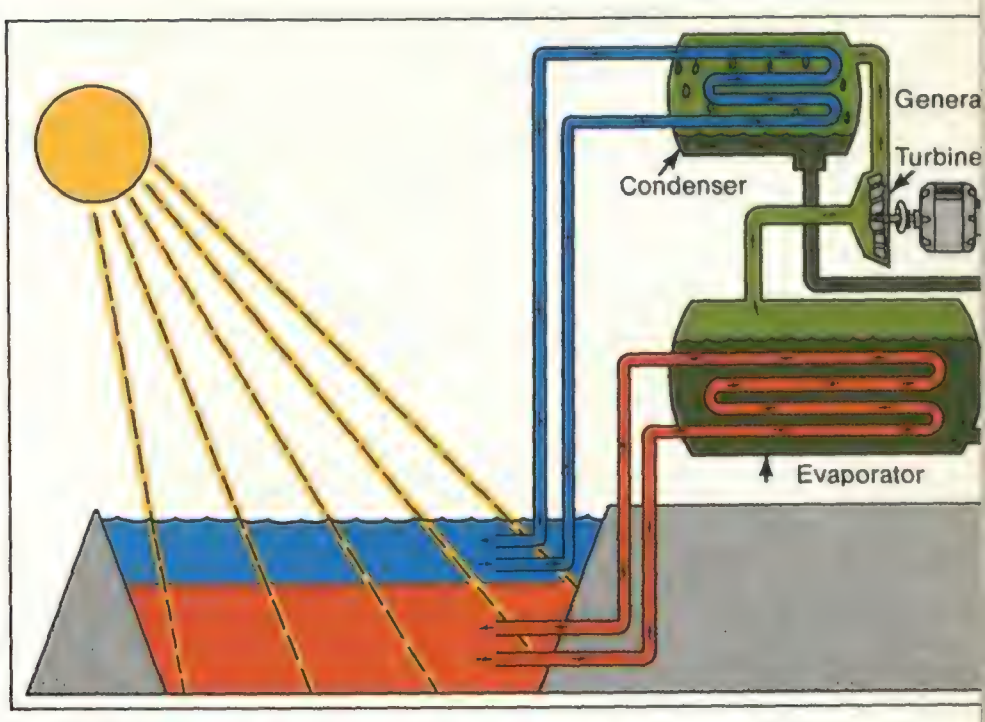
Technician in boat checks pond water at Ein Bokek. Behind him are evaporators, turbines and condensers

can be stratified, and the brine a few feet below the surface can reach temperatures near boiling, more than high enough to drive special turbines.

The idea has aroused interest outside Israel. In California a consortium including the state, the federal departments of energy and defense, Southern California Edison, and the California Institute of Technology's Jet Propulsion Laboratory, joined by Bronicki's Ormat Turbines, is spending $650,000 to study what could become a 600 megawatt generating complex on the Salton Sea. And in Utah approval is pending on a $1.2 million appropriation from Congress to do the same thing on the Great Salt Lake. The Utah project probably will begin with a 300- to 500-kilowatt pilot plant and go from there.

Salt water, or brine, is the key. Salt water is heavier than fresh (swimmers know they float higher and move more easily in salt water). In a solar salt pond a layer of brine lies underneath a shallow layer of fresher, lighter water. Sun penetrates the top layer and heats

of the power plant itself. The diagram at right shows how the sun's energy is extracted from the water.



Hot brine (red) from bottom of pond is pumped to evaporator, where a fluid (green) is vaporized to drive turbine and generator. Cool water (blue) from top of pond condenses the vapor back to a fluid.

the brine underneath. Even when heated, it is still too heavy to rise to the top—as warm water would ordinarily do—where heat would be lost by convection, evaporation and reradiation. The brine gets hotter and hotter, sometimes more than 200 degrees Fahrenheit, while the top layer acts as an insulating blanket.

Such ponds exist—but rarely—in nature. Hot Lake, near Oroville, Washington, is one. Salt ponds are known also in Hungary, Venezuela, Israel, even Antarctica. But stratification does not occur naturally in large bodies of salt water, such as the Dead Sea, because the wind and other factors mechanically mix the water.

In man-made solar salt ponds, or diked-off portions of larger bodies, stratification can be maintained and intensified. Relatively fresh water is added to the top layer as fast as it evaporates to maintain the insulating layer. Floating plastic windbreaks (p. 143) inhibit the formation of waves that would break up the top layer and mix the water. The brine holds heat for long periods of time, and generating stations can run day and night, good weather and bad.

In a typical plant (left), hot brine is piped to the evaporator of a heat engine where the brine's energy converts a fluid of very low boiling point from liquid to vapor. The vapor then expands through nozzles of a turbine, turning the turbine wheel and the generator that produces electricity. Finally, the vapor is led to a condenser, where cooler water from the top of the pond cools it back to a liquid state, and the cycle begins all over again. The idea works: in Israel, lights are burning and motors turning with electricity generated in just this way. The special turbines were developed by Ormat Turbines, the company Bronicki and his wife started in 1964. "We sold our apartment to raise some capital, and vowed to go to a kibbutz if we did not succeed." Succeed he has. His turbines (not all powered by salt ponds) are used in many places all over the world.

At the Ormat plant in Yavne, 20 miles south of Tel Aviv, a 15,000-square-foot solar salt pond delivers brine at 195 degrees to the evaporator to power a six-kilowatt turbine. The test pond at Ein Bokek, 70,000 square feet, will be followed by an even larger one to supply power for a resort hotel.

By 1978 Ormat clearly had something to offer. And California had the Salton Sea, a briny, shallow lake created in 1905-07 when flood water was accidentally

Wilson Clark, who writes often on energy, is the author of Energy for Survival. *He dealt with the subject in* SMITHSONIAN *in July 1976.*

diverted from the Colorado River; it now covers about 360 square miles. Over the years, agricultural chemicals in natural runoff and drainage have increased its salinity until now it is very salty—nearly ten percent saltier than the ocean and becoming more so. The biological community of the Salton Sea is unique, the result of natural selection and human intervention. Already the salinity has destroyed a number of freshwater species which were introduced by the original flooding. Transplanted ocean fish have provided sport fishing, but wildlife managers say the increasing salinity will kill them off in about ten years. The entire ecosystem is threatened with destruction.

Solar ponds, however, need brine in which the salt concentration approaches 25 percent, seven times saltier than the Salton Sea's water. Adjacent evaporation ponds used to provide the additional brine would begin to reduce the salinity of the lake as a whole. (Ponds along the Colorado River could drive desalination units. Because of intense agricultural use, the river is now much saltier when it crosses into Mexico than existing treaty obligations allow.)

Feasibility studies for the Salton Sea project are to be completed by next summer; design and construction of a prototype plant, using a diked pond covering about four-tenths of a square mile, are to begin in 1982. If all goes well, construction of the modules comprising the full-scale 600-megawatt plant —using a total of 46 square miles—will begin in 1985.

How much would it cost? No one yet has figures for the modules, but Ormat estimates the five-megawatt prototype would cost about $10 million and deliver electricity for about seven cents a kilowatt hour. This is about the same as a coal-fired plant. Playing the prediction game, Ormat scientists estimate that the western United States has the potential for producing more than 20,000 megawatts through solar salt ponds.

Bronicki has visions of solar salt ponds supplying one-third of Israel's energy by the end of the century. He hopes his dream of using the sun is coming true. If it does, solar salt ponds like those on these pages may become familiar sights throughout the West—and everywhere in the world where water, salt, earth and sun can be brought together.

Natural salt ponds, like this one in Israel, occur throughout the world; many could produce energy.

In the United States salt-pond projects, for electricity or heat, have been proposed in six states.

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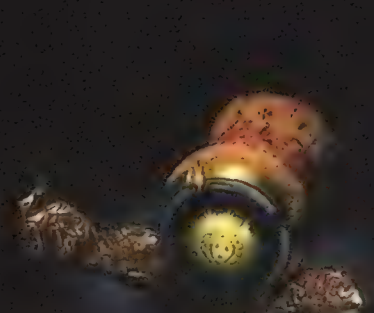

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By Frank Getlein

Armand Hammer and the remaking of an art collection

Ten years ago, his exhibit of great masters was called less than masterly; now born again, it is eminent and packed with prizes

We have it on Highest Authority that there is more joy in Heaven over one sinner who repents than over 99 just people who need no repentance. That being so, it is reasonable to assume that in Art Heaven right now joy is unconfined. The reason is the scriptural one that the lost sheep has returned to the fold. In this case it is Armand Hammer and his born-again art collection, opening now at the Corcoran Gallery of Art in Washington (October 4-November 30), then going to the Norton Gallery and School of Art, West Palm Beach, Florida (January 16-March 15, 1981).

For Hammer and for Washington, this is a return engagement, with a touch of the New York Mets climbing out of the cellar up to the rooftree. The last time "The Armand Hammer Collection" played Washington, ten years ago, it was a very different collection and was accorded a very different reception, namely hoots of derision. I myself was then art critic on the *Washington Star* and led the hoots. The *Washington Post* was equally unenchanted. There were, of course, some good things. But the overwhelming impression made by the show as a whole was that these were mostly pictures painted by the artist named on the label on a particularly bad day, or before he really became who he was, or after he had slipped into dotage. And there was a generous sprinkling of pictures that the late Daniel Catton Rich, who was director of the Art Institute of Chicago, used to call, generically, *The Dead Christ Supported by Attributions.*

The new Hammer Collection is now unencumbered of all those Dead Christs. The just-out-of-focus paintings have gone, replaced by the genuine article, and the drawings are magnificent. All in all, the collection is museum-worthy and may well be the last substantial private collection to be amassed in the classical area.

How did this reformation come about?

The answer is in two words: John Walker.

At the time of that Washington exhibition, the spring of 1970, John Walker had quite recently achieved the status of director emeritus of the Na-

An outstanding American painter of the late 19th century, Mary Cassatt worked mainly in France. She turned out *Summertime* (1894) when at the height of her powers.

tional Gallery of Art after 30 years, as chief curator and later director, of helping to build that institution from the Mellon Collection of about 150 works of art to the truly world-rank collection it is. He had seen into their beginnings the splendid East Building, designed by I. M. Pei (SMITHSONIAN, June 1978), and the concomitant new venture into 20th-century art and especially 20th-century American art. He knew Armand Hammer casually, as a fellow trustee of the Los Angeles County Museum of Art. He had noted the arrival of the collection at the Smithsonian's Museum of Natural History. He had read the notices and decided to skip the show.

Then he had lunch with an old friend, Sir John Foster, an English lawyer who managed the British legalities of Armand Hammer. Would Walker come and look? As a favor, Walker did, and expertly separated the sheep from the goats for Foster's instruction. Would he do the same for Hammer himself? No, Walker replied; he had spent his entire career *not*

Tuft of Cowslips, gouache on vellum (1526), is believed to be one of a series of plant studies by the great Renaissance master Albrecht Dürer, though some experts question the attribution.

explaining to private collectors what was the matter with their taste and he was not going to start now. He summed up more brutally than the Washington papers had what was the matter with the show: bargain hunting as a principle of collecting.

Foster reported to Hammer. Hammer talked to Walker, who continued to refuse. Hammer appeared in Washington, cajoled and persuaded. Warning that he would almost certainly recommend getting rid of at least half of the collection, Walker undertook to write a detailed report, object by object, on what was bad, what good, what permissible in the collection. Somewhat to his surprise, Hammer accepted the report and followed the recommendations, not, Walker points out, 100 percent but certainly 90 percent. Stung by the Washington reviews, Hammer was determined, he says, to make his collection the best obtainable.

Walker went on to advise Hammer on new acquisitions, not to be found at bargain prices, and here on this new foundation the born-again collection rests. The attraction for Walker in taking on this enterprise, granted the conditions of his high standards, seems obvious: it was Trent's Last Case. Could Walker do it one more time? The answer is on the walls at the Corcoran. He could and did.

For Hammer the new direction must have been much more difficult. Exactly what Walker put his finger on in his tour of the 1970 collection had been for decades the lodestar of Armand Hammer's brilliantly successful career in international trading and in art, and the two have often coincided.

The collector with his favorite painting, Rembrandt's *Juno* as goddess of wealth, painted in the early 1660s.

From Russia with know-how

Americans in general may think he's a brand of baking soda (in fact there is no relationship); the financial world thinks of him as Occidental Petroleum; the art world, until recently, thought of him for years as connected with the Hammer Galleries in New York, actually managed by his brother Victor.

The Hammer family, Russian in origin, started on the road to riches in Russia. That connection has contributed mightily to Armand's own rise. His great-grandfather, Vladimir, built ships for the Czar in the second quarter of the 19th century. Vladimir's son, Jacob, made a fortune in salt from the Caspian Sea. When that business was destroyed by floods, the family emigrated to New York, starting over but with a family tradition of trade and wealth. Jacob's son, Julius, began as a foundry worker, became a druggist's apprentice and then built up a chain of drugstores in New York.

Armand was Julius' son and a medical student at Columbia when the family firm foundered and appeared headed for bankruptcy. Armand took it over, put sales into high gear, added surplus Army drugs from World War I and, by the time he had graduated from Columbia medical school in June 1921, had made his first million dollars.

Meanwhile, despite the family's past Czarist connections, Julius had followed his socialist inclinations into groups that were not yet the Communist Party in America but would become so. He also involved the family drug business in an export trade with nascent Soviet Russia. In the atmosphere of the "Red Scare" of the time, Julius was indicted, tried and convicted on what now seems a highly dubious manslaughter charge and sent to prison with a 15-year sentence. Against that immediate family background and despite an appointment as resident at Bellevue Hospital in New York City, Armand Hammer set out for Soviet Russia, bearing gifts in the form of a fully equipped field hospital.

He speedily gained the confidence of Lenin and of the trade officials who would survive the Stalin era. He found at once that the commissars were more interested in food than in medicine, in industrial development than in field hospitals. With the offer of a million bushels of wheat from America to combat famine, Armand Hammer was on his way to becoming a crucial actor in the developing trade between the

Art critic Frank Getlein comments on cultural affairs for public radio; he has just finished a book on the life and work of Mary Cassatt.

Watteau's *Couple Seated on a Bank* is a little idyll drawn in three chalks—red, black and white.

Soviet Union and the capitalist world. He brought hundreds of Fordson tractors into Russia, thus being responsible for one of the great romantic themes of early Soviet movies. He started a pencil factory, essential to the most highly bureaucratic government the world had ever known. He and his brother Victor set up headquarters in the former Fabergé workshop and bought at distress prices the Fabergé and other luxury goods of the old regime. In a complicated deal that sold off the pencil factory to the state, the Hammers were allowed to bring out of Russia the Czarist art and artifacts they had accumulated.

After a faltering start, the brothers made a great success out of selling "The Treasures of the Romanovs" in American department stores, most notably Lord & Taylor in New York. A few years later, it was the Hammers who, naturally, arranged for the sale of the William Randolph Hearst collection at Gimbel's and Saks Fifth Avenue.

Armand went on to profit from every angle of a triangle of whiskey, surplus potatoes and oak staves for barrels, and from just about everything he turned his hand to, up to the pinnacle—so far—of Occidental Petroleum, which he led from its net worth of $34,000 in 1957 to impressive sales of $9.6 billion last year. More recently, he has entered into an agreement to build a fertilizer plant in Egypt which could have profound effects on that country's agriculture.

The Russian connection has remained alive. Hammer's trade activities are accompanied by cultural exchange and, sometimes, a kind of personal diplomacy.

So successful, indeed, has he been that he has aroused the suspicion of at least one scholar. In his basic book in the field, *Russian Art and American Money 1900-1940,* Robert C. Williams traces the Hammer history in meticulous detail and concludes, "There is far more evidence that the Hammers were sellers of Russian art for the Soviet government during its great art sales of 1928 to 1933 than that they were private buyers of it while living in Russia. They had combined their family business with the Soviet government for years."

If it is so, it is a grievous fault only to those who believe that any contact between Americans and Soviet Russians, real or fiscal, is dangerous, that trade is treason. For persons with less rigorous views, the cultural exchanges promoted by Armand Hammer have been at least some theoretical help toward mutual understanding, and the trade ties have been useful because trade generally is useful, and because a fundamental principle of trade is "don't shoot the customers."

To Professor Williams' charges, Armand Hammer says forthrightly, "That's a lie," countercharges Williams with "poor research" and adds one of the all-time great understatements: "I've been a capitalist all my life." And, indeed, he may be the last capitalist in the Adam Smith sense, as distinguished from managers on the one hand, shareholders on the other.

If this collector, like so many through history, seems to require such apologia, the collection, as it now hangs, decidedly does not. It is not exactly "Five Centuries of Masterpieces," as the show is billed, but there are more than enough splendid paintings, some among them masterpieces, and there is a glorious run of drawings.

The drawings begin with Leonardo, Raphael and Michelangelo. Andrea del Sarto is represented by a sensitive black chalk drawing of a woman's head (opposite). Correggio and Tiepolo are also present. From the North there is a glowing Dürer gouache on vellum (although some experts contest it).

There are two Rembrandt oil portraits and the goddess Juno in regal panoply. The *Juno* is Hammer's personal pride (p.153), his favorite picture.

There is a pleasant Rubens painting of a young woman and a spectacular one of *The Israelites Gathering Manna in the Desert*. This was one of a series of *modelli* (full-color sketches) done for tapestries on the theme of the Eucharist. Another *modello* in the series, *The Meeting of Abraham and Melchizedek,* hangs in the National Gallery.

The center of gravity of the collection is French—18th through 20th centuries—and you could hardly find a better center in terms of old quality still available in the 1970s. There are some wonderful paintings.

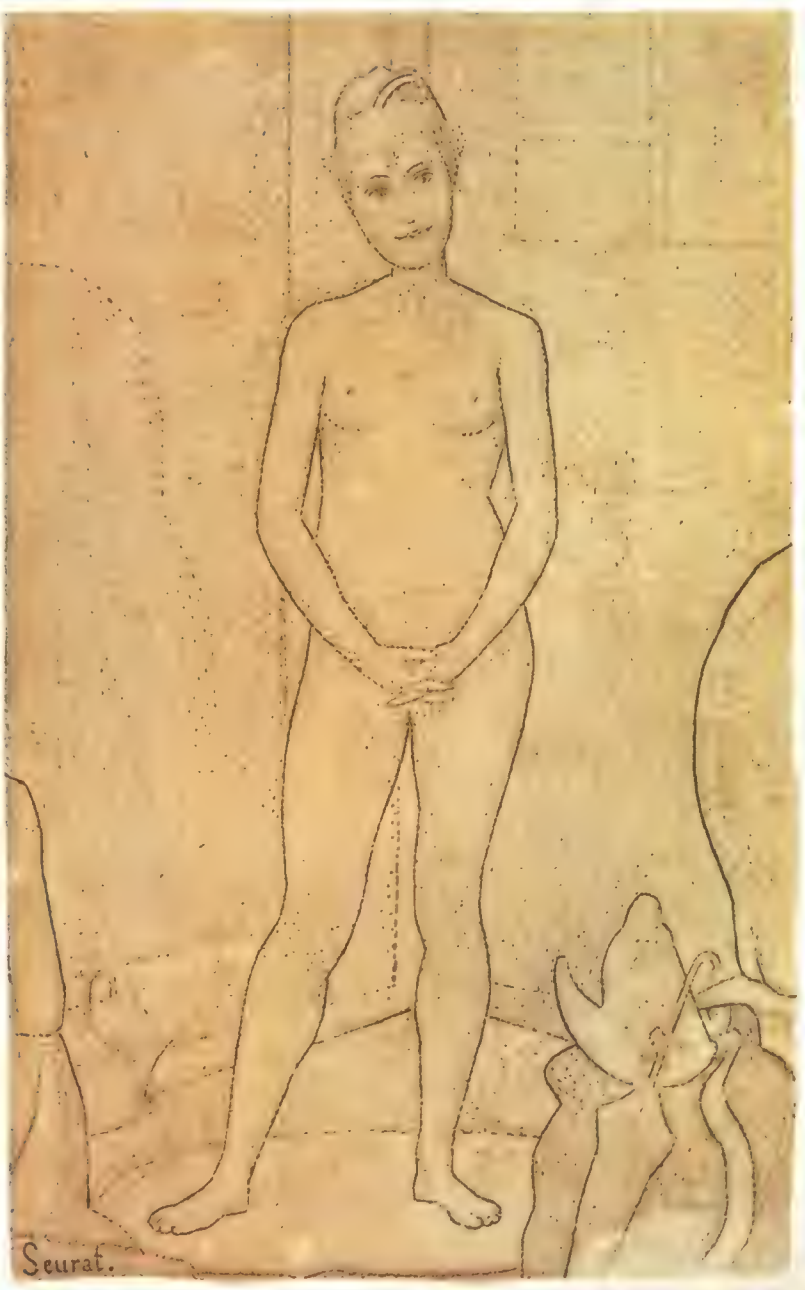
There are also some odd ones, but not odd in the way things were a decade back. The Fragonard *Education of the Virgin* is a modestly lovely thing in itself, but it was painted when Fragonard was in his late teens, before his total immersion in the Roman scene, before his crucial discovery that his métier was not heavenly piety but earthly love.

There are several Corot oils that ten years ago seemed to enforce suspicion, since Corot is the artist said to have painted six or seven thousand works, of which ten thousand are in the United States. In the new context they look authentic. Three of them are superb examples. Most of the Impressionists and Post-impressionists are present, along with some of their non-card-carrying contemporaries. Of particular note are two Fantin-Latour bouquets, the van Gogh *Hospital at Saint-Rémy,* 1889, and from four years earlier, a quite remarkable oil of the landscape seen from his father's rectory garden at Nuenen, untypical in its golden browns beneath melting snow and white sky.

The premier painting by Vincent's sometime chum, Gauguin, gives you pause. Walker's demurrer, that Hammer took not 100 percent but 90 percent of the advice asked and given, comes to life with this picture, at least to the eye of this writer. In John Rewald's definitive book *Post-Impressionism: From van Gogh to Gauguin,* published by the Museum of Modern Art, a picture, *Bonjour, Monsieur Gauguin,* is listed as being in the collection of the Museum of Modern Art, Prague. The Hammer Collection catalog includes a painting of the same subject as its own (p.158), and it acknowledges that the Prague picture is either a preliminary version or a later copy of the painting by the artist.

By the wildest kind of coincidence, I had been in Prague about six months before the 1970 opening of

Tenderly observed drawing of a female head in black chalk is by the Florentine master, Andrea del Sarto.



Superb in its own right, this pointillist drawing by Georges Seurat is after his painting *The Models.*

the Hammer Collection and had seen its picture. When confronted with the Hammer picture I felt instantly that *it* was the copy. The Prague picture seemed to me then and seems to me now very clearly the stronger of the two: everything in it is right, painted from life, the painter's imagination, and the instinct of homage to Courbet, who had painted a similar picture. The Hammer picture, to my eye, gives every evidence of having been painted from a picture, and that picture is the one in Prague. Against that, it is fair to recall, I was seeing the Hammer picture in its context of "off-day," "bargain-hunting" pictures. My eyes are now 11 years away from Prague and I wouldn't dare to assert that one is the first and the other the later version. I only say what I remember.

Well, one who can and does is Armand Hammer himself. Realizing the doubts about his picture, Hammer packed the picture, himself, his wife and an art adviser into his personal jet, flew to Prague and, on a Sunday when the place was closed to the public,

John Singer Sargent's portrait, *Dr. Pozzi at Home,* is in his most dramatic and fluent bravura style.

This late work in the free-flowing manner of high Impressionism, Pissarro's *Boulevard Montmartre,*

got the Modern Museum opened. The two pictures were placed side-by-side and, according to Hammer, all agreed that his was the original. It may well be so.

In the 20th-century French department, there are a Rouault, a Modigliani, a Soutine and others. The standouts are two: a Vlaminck *Summer Bouquet* that has all the impasto verve and lights in deep space familiar in his landscapes; and a darkly golden *Nude against the Light* by Bonnard in which the curves of the standing figure are gently contained within the straight-line geometry of *toilette* furnishings. Bonnard's colors were never more complex and subtle.

The richness of the drawings delights time after time: a group of Fragonard domestic scenes done with affection, ease and perfect mastery; a Boucher of Venus reclining on a dolphin that is all the best of Boucher with none of the lubricity he frequently provided for an audience that wanted it; and, the peak of the 18th century in the collection, a Watteau in red, white and black chalk, *Couple Seated on a Bank* (p.154), that

Mardi Gras, 1897, is not in the Corcoran exhibit but was lent by Hammer to a major Pissarro show in England.

Powerful, yet intimate, *Nude against the Light* is an outstanding example of Pierre Bonnard's art.

is a miracle of casual elegance in the drawing as in the figures themselves. In a 19th-century group that includes a pencil portrait by Ingres, studies by Cézanne, drawings by Gauguin from Tahiti and Brittany, the real prize is the Seurat study after the large painting, *The Models* (p.155), in which the central figure is isolated by a firm line from the background, with the dotted ghost of *La Grande Jatte* behind.

The Hammer Collection has few American works, but they are choice: an emblematic Stuart *Portrait of George Washington,* a fine Harnett still life (opposite), two Sargent portraits and an absolutely great Eakins portrait, *Sebastiano Cardinal Martinelli,* which the painter presented to Catholic University, which, inevitably, eventually, put it up for sale and placed John Walker in a rare conflict of interest. As a university trustee he urged the administration to keep it; as Hammer's adviser, he urged Hammer to buy it and Hammer did.

And there is a lovely Maurice Prendergast beach scene in his tapestry style. The knockout American work is Mary Cassatt's *Summertime* (pp.150-51), painted in 1894 when she was at the top of her form, an extremely rare landscape in which the paint strokes themselves echo and enhance the seasonal ease of the women on the water.

The new, cleaned-up Hammer Collection is a joy for three institutions as well as for the two men chiefly responsible. The paintings are designated for eventual gift—a process already begun—to the Los Angeles County Museum of Art, a godsend after that museum lost its principal attraction, the Norton Simon Collection, which went to the Norton Simon Museum (SMITHSONIAN, September 1977). The Corcoran is exhibiting the Hammer Collection as only the latest in a series of benefits it has derived from the Hammer connection, one forged by Corcoran board president David Lloyd Kreeger and a couple of his fellow trustees. Hammer has been a trustee of the Corcoran since November 1978. His most spectacular gift has been a $900,000 grant to enable the gallery to drop its admission charges, an essential move in a city in which admission to most of the other great museums is free, thanks to federal funding. His most visible benefaction will be the refurbishing of the auditorium for $250,000. His great Daumier collection, the heart of which was formerly the celebrated Longstreet Collection of lithographs and wood engravings, was shown at the Corcoran last year. (The Daumiers will go to the Los Angeles County Museum of Art, further enriching that institution's collections.) Attendance, thanks surely in part to Hammer's gift to cover admissions, is now at its highest in the Corcoran's history. Hammer is accompanying the Corcoran to new achievement under its new director, Peter Marzio.

And John Walker? The drawings—the pure gold—are slated to go to the National Gallery of Art.

Hammer's *Bonjour, M. Gauguin* by Gauguin has an alter ego in Prague, but which is the original?

This still life is in the selectively precisionist style of Irish-American painter William Michael Harnett.

Environmental activist Bela Kerecz:

"Bethlehem Steel is going to dump millions of gallons of this polluted water into Baltimore's waste water treatment plant. "The city's all for it."

"It's a real success story," says Bela Kerecz, a pollution abatement engineer in Bethlehem Steel's research department.

Bob Mohr, plant manager of Baltimore's huge Back River waste water treatment plant, calls it "A unique example of government and industry cooperation."

What they're talking about is how a waste product called "pickle liquor" is going to solve an environmental problem—and save millions of dollars for both Bethlehem and the City of Baltimore.

Everyone benefits

Bob Mohr explains: "Federal and state laws require cities to limit phosphorus in the treated waste water they discharge. They also require Bethlehem Steel to properly dispose of spent acid water, or pickle liquor, which results from making sheet steel.

"By using Bethlehem's pickle liquor to reduce the phosphate level, the City of Baltimore will save the cost of chemicals needed with conventional methods. And Bethlehem will eliminate the need for an acid-reclamation plant, a major capital expenditure."

More government/industry cooperation needed

This pickle liquor project is what government/industry cooperation should be all about: *working together to protect public health at the lowest possible cost to taxpayers and to industry.*

Bethlehem's policy is to work with state and Federal agencies toward developing and implementing cost-effective environmental control programs.

However, Bethlehem believes that some regulations are overly restrictive or have requirements that are not realistic. For example, does it make good economic and energy sense to require industry to "purify" the air and water beyond what is necessary to protect public health?

Our position is clearly explained in our booklet, *Steelmaking and the Environment,* which includes our *Statement on Environmental Quality Control.* If you would like a copy, write: Public Affairs Dept., Room 476, Martin Tower, Bethlehem Steel Corporation, Bethlehem, PA 18016.

Bethlehem

How pickle liquor solves the problem

Bela Kerecz, one of Bethlehem Steel's thousand employees active in our environmental control program, explains: "Pickle liquor contains iron sulphate. We knew that under properly controlled conditions the iron would combine with the phosphate in the waste water to form insoluble iron phosphate. The iron phosphate, in turn, would settle as a solid which could be disposed of readily. The small amount of dilute acid in the pickle liquor would be neutralized by the normal alkalinity of the treated waste water.

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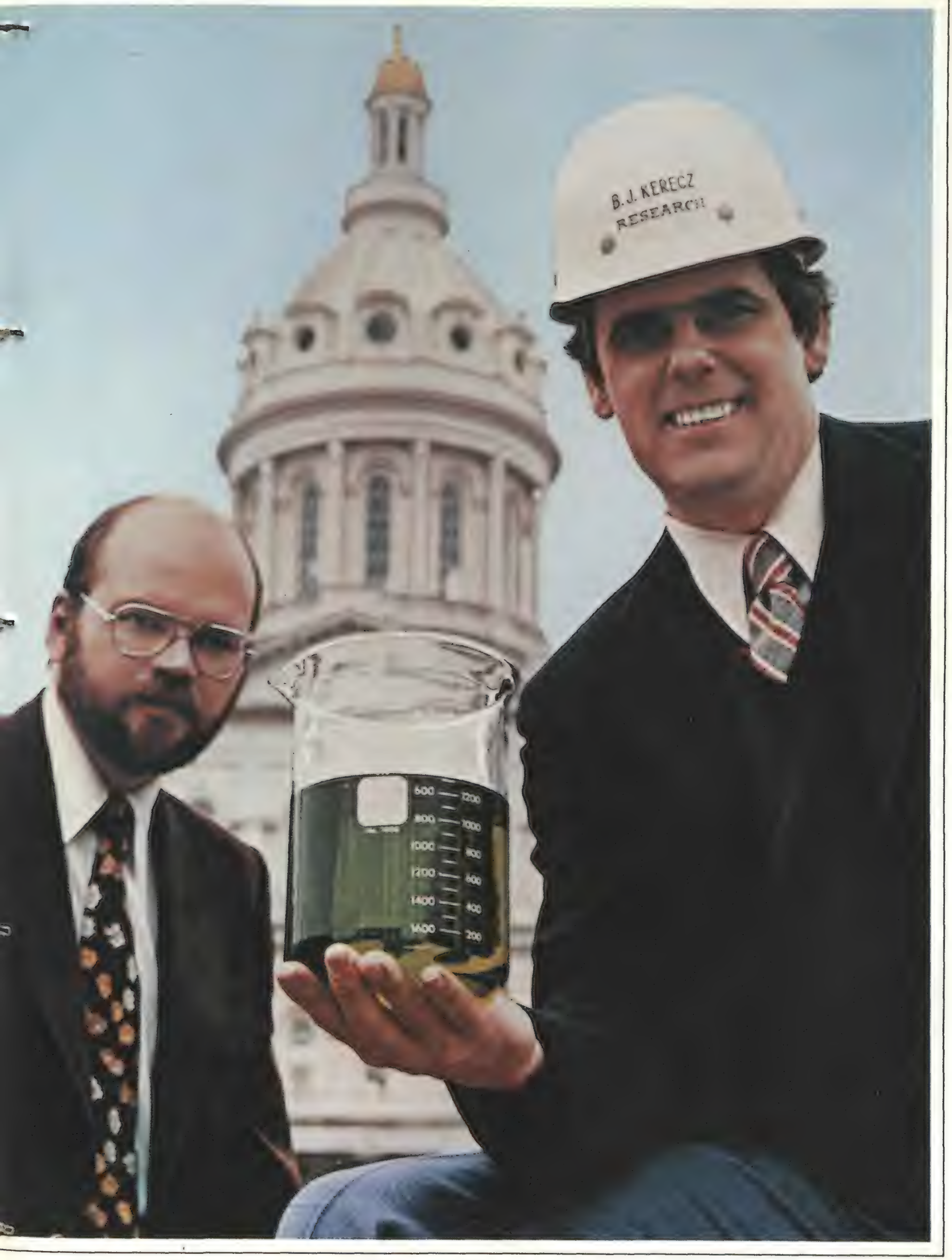

B.J. KERECZ
RESEARCH

By David Nevin

Bold men are still enticed by our world's frontiers

The Explorers Club celebrates its 75th birthday as the members uphold a grand tradition of brains, brawn—and pluck

Arctic mountaineer George Van B. Cochran and wife Caroline show the club flag atop Bylot Island peak.

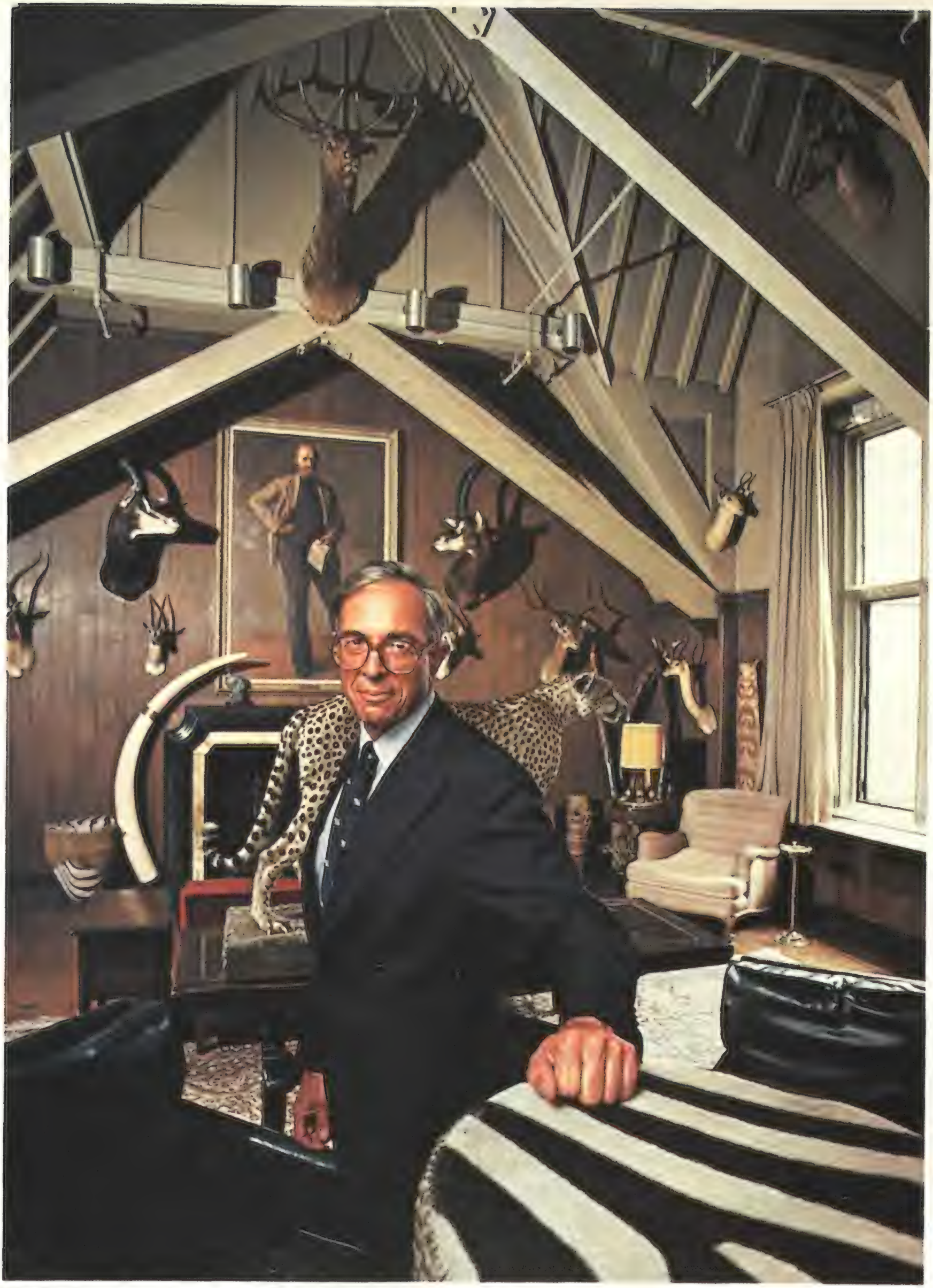
A press conference was in progress at the Explorers Club on East 70th Street in Manhattan, an elegant six-story Tudor town house paneled with carved and fretted oak and filled with the memorabilia of a thousand explorations that have traversed ice, desert and jungle in scientific searches that often breached the limits of human endurance.

The conference had been called to announce an expedition that would combine bona fide science with science fiction, a union reminiscent of our voyages to the moon. Plans were to use the latest technological advances in a search for the hulk of the *Titanic,* which lies on the bottom of the North Atlantic in some 12,000 feet of water, 68 years after striking an iceberg. If the search ship should locate her—and indeed in mid-August it *would* locate an "object" of the right dimensions—next summer the deep-diving *Aluminaut* submarine would examine her: robot television cameras on long cables would creep into the hull to probe for her secrets.

The father of this project was Mike Harris, a 44-year-old expedition operator from Tampa, Florida, and a member—naturally—of the Explorers Club. Harris has searched for Noah's ark on Mt. Ararat and smashed his ribs going over a waterfall in Mexico while filming a quest for the legendary treasure of Pancho Villa. He took his *Titanic* idea to Jack Grimm, an Abilene, Texas, oilman, who put together a group to finance the venture. Next, scientists from Columbia University's Lamont-Doherty Observatory and from the University of California's Scripps Institution of Oceanography formulated the experiments needed to locate a hulk that rests on the ocean floor and might be anywhere within a 300-square-mile area. A 180-foot vessel was engaged, Grimm began negotiating a book contract which, with Harris' documentary film, may or may not recover the costs, and the Explorers Club press conference was set.

Charles Brush (opposite), the club's energetic president, spoke first. Then Lowell Thomas, the 88-year-old honorary president and grand patron of the club, recalled reporting the original *Titanic* story in 1912, ending his remarks with a grin and a characteristic "Good luck Mike Harris, good luck Mr. Grimm—and so long until tomorrow!" Brush presented the 199th Explorers Club flag to the expedition, 198 already having been carried to almost every part of the Earth and to the moon. (The flag is lent—never *given*—to members engaged in original scientific exploration and must be returned to the club for the archives.)

Harris explained the *Titanic* venture and the scientists asserted their seriousness. The first press question was addressed to President Brush and it struck a sour note: "The Explorers Club has always been associated with serious exploratory endeavors. I wonder, in view of the media hype [for this one], second only to the jumping of the Snake River by Evel Knievel, if there isn't perhaps an overriding commercial consideration here that goes beyond the traditional feeling of the membership of the club?"



The Explorers president, archaeologist Charles Brush, stands in the club's lounge and reading room amid trophies from expeditions of long ago. Portrait over fireplace is of Greenland explorer Peter Freuchen.

the warm glow of brass

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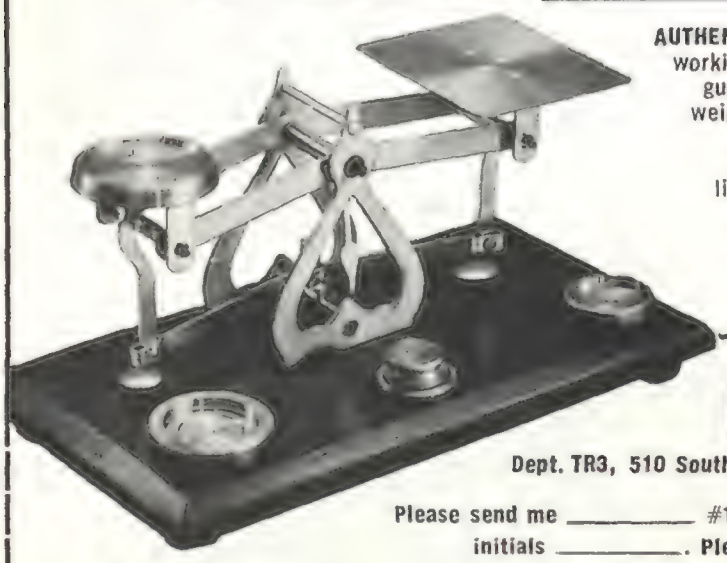

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Lawrence of Arabia (left) was leading an Arab revolt against Turks in 1918

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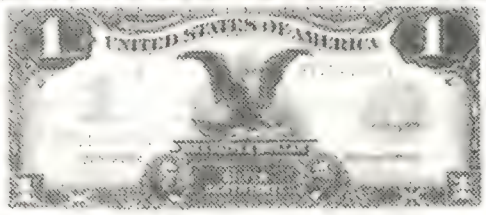

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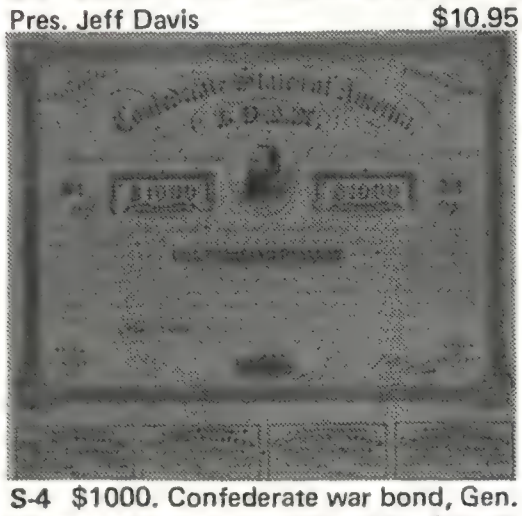

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"I don't think so," Brush answered. "The Explorers Club flag is never used commercially, never photographed with a product, never sold. I think you are confusing commercializing with popularizing. Popularizing is important to exploration because it means the broad transmission of knowledge. Without it, knowledge remains locked up in its temples. Explorers Club members have been roaming the world since 1905, and many of them have written about it and made films of what they've done and where they've gone. If these films recover some of the costs, so much the better. We think that the popularizing of exploration and propagating of understanding of the world's magnificent diversity is just what the Explorers Club should be about."

Thus Brush gave a virtual charter for one of America's most distinguished private institutions, a club that has always been more than just a club but has never forgotten that it *is* a club. Seventy-five years old this month, it serves as a unique gathering place for world explorers. In its rooms, men of great "challenge" expedi-

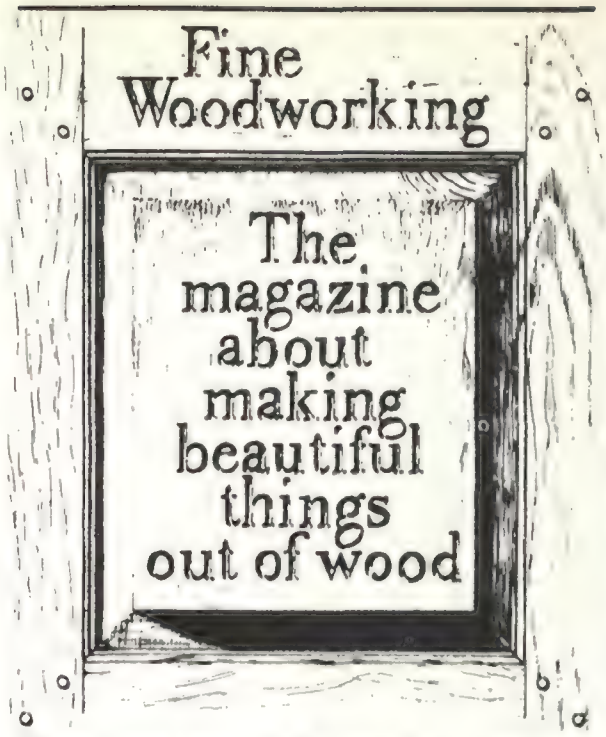
when Lowell Thomas (right) met him and promptly made him a world celebrity.

tions—from polar flights to moon shots—interact with research scientists, with other voyagers to exotic places, with authors and film makers, with men who climb the world's great mountains and cross its seas alone under sail, and with amateurs who simply take pleasure in penetrating territory where few have walked before.

To look at the current membership of the Explorers Club—which once boasted names like Peary, Amundsen, Ellsworth, Stefansson, Byrd, Roy Chapman Andrews—is to confront the conundrum of what exploration really is in a day of superscience and supersonic speed. Explorers continue to combine original research with a willingness to go and see for themselves.

George Van B. Cochran, for example, is an orthopedic surgeon who implants tiny electronic gauges in animal bones to measure strain. A club officer, he is also an avid mountaineer and ice climber

David Nevin, a frequent contributor, wrote about pioneer aviators Alcock and Brown in the March SMITHSONIAN.



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(p. 162). He wondered if a similar small-gauge technique could be used to measure compression in ice fields in order to learn more about them and perhaps about one of nature's more mysterious forces, the glacier. A couple of weeks before the *Titanic* announcement, Cochran had quietly returned from a rugged month on Ellesmere Island about 800 miles south of the North Pole. With a party of six, he had gone 120 miles, some over broken ice, to reach base camp and had traversed ice valleys that were virtually unexplored.

At base camp the group set up its instruments and then, for sport, climbed snow-and-ice-covered mountains which had not been climbed before. It was Cochran's eighth Arctic expedition. Ultimately, if his concept works, glaciologists will have an important new tool—and from the Explorers Club will have come another advance in knowledge of the physical world, the sort of knowledge gained by going somewhere under conditions that most of us would rather read about than experience.

That willingness to go where physical discomfort is standard, and danger and suffering are probabilities, marked the men who sat down in 1904 and decided that there should be an Explorers Club. Exploration in those days was focused on the Arctic and the ice mysteries which Norway's Fridtjof Nansen had partly clarified when he deliberately froze his

Roy Chapman Andrews eyes dinosaur egg he discovered in Mongolia in 1920s.

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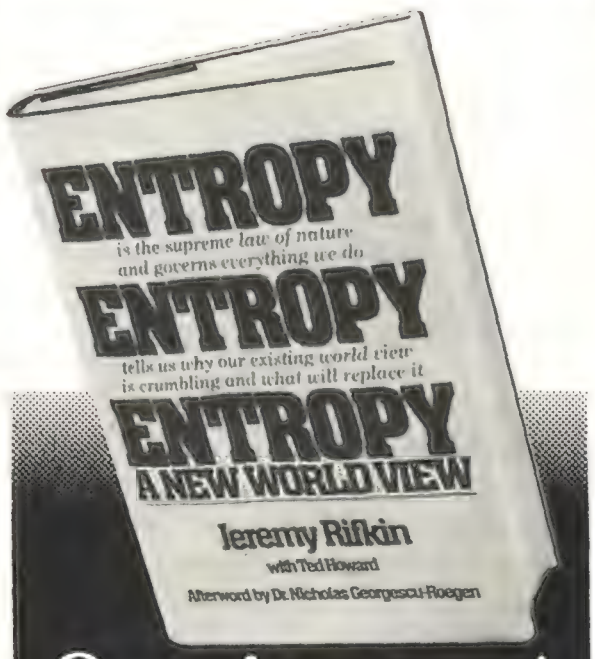

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Thor Heyerdahl's educated curiosity about ancient sea routes led him to reed-boat expeditions; his *Tigris*, right.

ship, *Fram*, into the ice pack in 1893. The embedded ship drifted across the top of the world for 35 months.

In 1881, on one of the more disastrous 19th-century Arctic undertakings, an American, Adolphus W. Greely, had been left with 24 men to set up a scientific outpost on the ice of northern Ellesmere Island. When supply ships failed to reach them at the end of the second year, Greely and his men retreated south but were stranded for another year during which most of them died of starvation. When a relief expedition finally arrived, Greely and six others were barely alive. Fortunately, many of their records were later recovered. One of the survivors was David L. Brainard. Twenty years later, Brainard, an original member of the Explorers Club, asked Greely, then commander of the U.S. Army Signal Corps, to serve as the club's first president.

By that time, rapid-communication systems were making popular heroes of men who faced the unknown and came home to write books about it. Robert E. Peary reached Greenland's northernmost point in 1900, crossed 87 degrees North in 1906 and, with brilliant planning, reached the North Pole in 1909 by dog sledge. With him were four Eskimos and a black American named Matthew Henson (p. 170), who had been his aide and fellow explorer since 1887 (a bust of Henson stands in the Explorers Club today).

Roald Amundsen of Norway navigated the Northwest Passage during 1903-06 and in 1911 was first to reach the South Pole—just ahead of Captain Robert Falcon Scott, the British explorer who, a victim of starvation and exposure, perished with all his party. Manitoba-born Vilhjalmur Stefansson, who ranged across the Canadian Arctic, would twice be the club's president.

The polar period faded and what club members liked to call "the jungle men" took over. In early 1914, Theodore Roosevelt, later a member, descended the River of Doubt during a 900-mile expedition through the untracked jungles of the upper Amazon region. Men affiliated with the American Museum of Natural History, which was around the corner from the club's rooms in those days, began to dominate the Explorers: Roy Chapman Andrews with his Asian treks (p. 166) and Carl Akeley with his mounted African animals and his pioneering jungle cinematography, from which evolved Osa and Martin Johnson's films so fascinating to audiences of the 1920s and '30s. Both Andrews and Akeley were club presidents.

The club drew men with a taste for action: Richard Harding Davis, war correspondent; Billy Mitchell, who installed telegraph lines in Alaska years before he became America's apostle for air power; Admiral Richard E. Byrd of the Arctic and the Antarctic; Charles A. Lindbergh; Lowell Thomas, whose desert treks brought Lawrence of Arabia to world attention for the first time. There are also great names today: Sir Edmund Hillary of Mt. Everest fame; Jacques Piccard of the sea bottom; James Lovell of the moon; Great Britain's Prince Philip; James Michener, whose novels explore the world; and the irrepressible Thor Heyerdahl (above).

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COSMOS is produced by Carl Sagan Productions and KCET, Los Angeles. Made possible by grants from the Corporation for Public Broadcasting, the Arthur Vining Davis Foundations and Atlantic Richfield Company.

Take Heyerdahl as a classic Explorers Club figure. In the club's lobby stands a handsome antique globe, a bit chipped and marred, on which members like to say Heyerdahl planned the voyage of the *Kon-Tiki*. In fact it wasn't that simple. In 1947, Heyerdahl described his plan in an invitational letter to a friend: "Am going to cross the Pacific on a wooden raft to support a theory that the South Sea islands were peopled from Peru." Heyerdahl was living at the Norwegian Seamen's House in Brooklyn to save money. At the club, a committee gathered around the battered long table in the boardroom to consider awarding the flag to Heyerdahl and his balsa-wood raft. Among those who heard of the proposal was Peter Freuchen, the great Greenland explorer who had once amputated his own frozen toes and who now stamped about the club on a wooden leg.

"Damn it, boys," Freuchen said enthusiastically, "I should like to go with you!" He did not go, but with his help and the club's endorsement, the voyage of the *Kon-Tiki* was under way. What makes Heyerdahl a classic Explorer figure is that he personifies the club's essential style: scientific but not academic (many anthropologists sniff at his ideas), adventurous but entirely serious, hardy but not foolhardy, possessed by an idea that stirred his imagination, and equipped with the courage to carry it out.

The club endorsement gave Heyerdahl credibility, opened closed doors, helped him get funding. Symbolized by the flag, that endorsement is vital to an explorer who has no moon program or naval expedition or other government project behind him. Heyerdahl was essentially a novice explorer with a great idea. Even he does not claim that he proved any-

A. W. Greely (right), first club president, greets Arctic veteran MacMillan, 1925.

A skilled explorer, Matthew Henson went with Peary to North Pole in 1909.

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thing, but how his theory stirred men's minds and how his adventure stirred their hearts! That combination of mind and heart seems to sum up what exploration means in our time.

To call Heyerdahl an amateur, of course, is to ignore the professionalism he brings to his voyages, without which he and his crews might not have survived. Perhaps the question today is whether exploration in the traditional sense still has meaning. Do Peary and Matt Henson and four Eskimos dashing for the Pole compare with the men in a Boeing 707 crossing both poles in less than 35 hours to study high-altitude cosmic rays? Does the man in the space capsule, poised atop a rocket at the apex of billions of dollars worth of engineering and organization, relate to Roy Chapman Andrews in the Korean wilderness with peasant bearers who suspect that he—and they—are irretrievably lost?

Has exploration, as experienced since Man came out of a cave and wondered what was beyond the ridge, been killed by new knowledge and technology?

Lowell Thomas had been waiting for the question. He came to our interview at the Marco Polo Club (an international meeting place) looking trim in a powder blue coat. His hair is grizzled now, the famous black moustache graying, but you do not see his 88 years until you are very close and you do not hear it at all in his voice. The time of exploration past? "No," he said quickly, with heat, the answer that he has given to 10,000 audiences. "This is the golden age of exploration, greater than in Columbus' time. Yes, I mean that. Most of the planet has yet to be explored in detail. The land masses have been entered, we've done the poles, but not in detail. And they're always coming up with some new dimension of something 10,000 years old. And the undersea studies—we're entering a new age."

Antarctic pioneer Richard E. Byrd (left) returned to Little America in 1955.

Thomas loves the Explorers Club and has worked hard for it. He donated generously toward purchase of the 70th Street building, which is named for him. What was the club like 52 years ago when he joined? Was it mellow, relaxed? Were men of repute sitting around the fire with pipe and sherry, making it a place for listening to each other's engrossing tales? Annoyance crackled in his voice: "I don't hang around anywhere—never did. Too much to do, too many places to go." He has accomplished a vast amount during a long life—and not by wasting time. Then he was up, moving on, too much to do,

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too little time. "So long," he said briskly.

As the club celebrates its 75th anniversary, Charlie Brush agrees that exploration has a bright future. "There are thousands of peaks still unclimbed—literally thousands. We've mapped the globe by satellite, but much of it Man still has not penetrated. Huge cave systems remain unexplored. In the sea, in space, in new archaeological finds, in coring the Earth to determine its nature."

Brush has knocked about the world: managed a plantation in Jamaica, twice driven the length of Africa, earned a PhD in anthropology at Columbia. He neatly bridges the division in the club between the scientist who rates himself by his publications and the man who wants to go somewhere in order to see what is there. Brush's archaeological digs in Mexico produced respectable firsts in recovery of ancient pottery and bronze alloys, duly published in *Science*. Then, nine years ago at 48, he climbed his first mountain.

The mountain was Mexico's Popocatépetl at 17,887 feet. He next tried its neighbor, Iztaccíhuatl, and then went to Tanzania to climb Kilimanjaro. He also climbed Aconcagua in Argentina, at 22,834 feet the highest summit outside Central Asia. Life is rough at those altitudes. Near the summit, reeling from oxygen deprivation, he passed the body of a Japanese climber, dead about a year, freeze-dried and intact. Descending, when he got so cold that he could not close the zipper on his parka, hypothermia set in and he contemplated this epitaph: "He couldn't get his zipper zipped." Fellow climbers found him in time and he managed to crawl into a sleeping bag. Later, on Mt. McKinley, a companion died of pulmonary edema and Brush has not climbed since.

Like Brush, most of the club's 2,700 members are "fellows," meaning they have qualified on accomplishment, usually scientific; a lesser number are simply members "interested in" exploration. Some 600 Explorers live in the New York City area and the rest are scattered around the world, with a surprisingly large contingent in Kathmandu, Nepal. There are a number of regional chapters, in such places as New England, Florida, Washington, D.C., California and Great Britain.

The club does not admit women to membership, an anachronism that perhaps betrays the fact that many of its members are growing old. Some would be glad if the subject of women members would go away, which seems not at all likely. Meanwhile, they do share Christmas parties with their counterparts in the Society of Woman Geographers.

The club also sponsors a lecture series, stages an annual dinner and occupies

Theodore Roosevelt looks just like the bully Explorer he was. His Brazilian expedition was first to descend River of Doubt, renamed Rio Roosevelt for him.

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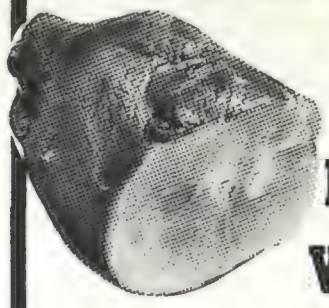

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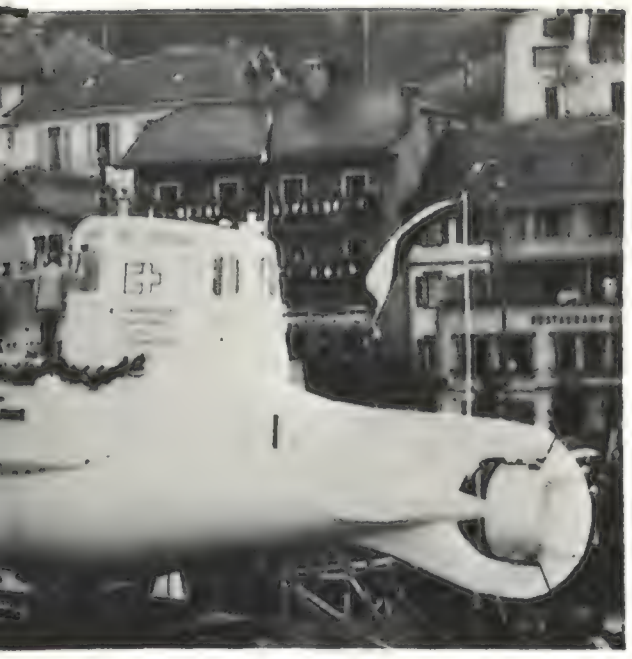
comfortable quarters—complete with elephant tusks framing the fireplace, portraits of great explorers (p. 163), an eight-foot polar bear rampant, an Arctic sledge well ice-scarred, spears and blowpipes, sculpture and antiques—but few members actually come to trade reminiscences.

What do they get from the club? They can associate with others like themselves and get advice and moral support for unusual endeavors. If a member wants to climb Aconcagua or trek into the New Guinea jungle, find an untouched valley on Baffin Island or search for a ship on the bottom of the sea, there is no other place where he is so likely to find someone who has done it.

Members also have license to quarrel; infighting is a club tradition. General Greely was incensed when Peary, returning from a visit to the camp in which Greely nearly died, hinted at incompetence. Peary was angered when Frederick A. Cook claimed to have reached the North Pole first. (Cook, a founding member, was drummed out of the Explorers Club in 1909 when his claim to have climbed Mt. McKinley was deemed false.)

Amundsen, himself criticized for his "secret" attack on the South Pole when Scott was already en route, wrote with vitriol in his memoirs about Stefansson for playing down the hardships of polar exploration. When Byrd said he had overflown the North Pole, there were many doubters. Heyerdahl has taken his lumps: scientific purists often rap the popularizers. Two expeditions carrying club flags



it took tourists for 300-foot dives to help popularize undersea exploration.

this year reported that they had made first contacts with previously undiscovered Stone Age bands in New Guinea; neither thought much of the other's claim. "We need a battle room," says Lowell Thomas, "to let them—the prima donnas and the real explorers—fight these things out."

While many club fellows seem motivated to do strange, difficult, intriguing things, there have always been "traditional" scientists. One of the club's presidents was Alexander Wetmore, a world-renowned ornithologist and the sixth Secretary of the Smithsonian Institution; the Smithsonian's current Secretary, S. Dillon Ripley, is also an Explorer.

Another former president is Serge A. Korff, a leading cosmic ray physicist (in 1940 he coauthored the original paper on neutron production by cosmic rays). He did his pioneering work atop mountains in Peru, returned by canoe down the Amazon, and 30 years later supervised the scientific studies on that flight over both poles. Good explorers, he feels, are scientists, not adventurers: "Adventure is something we don't like." He repeated an old Explorers' saying: "An adventure is an exploration gone wrong." Korff feels that publication is the key to legitimacy. "See the difference: Columbus published; Ericson didn't."

Many club members are professional scientists who apply their disciplines in unusual ways. One, a zoo veterinarian, tells of the time the anesthesia wore off as he repaired a grizzly's tooth and how

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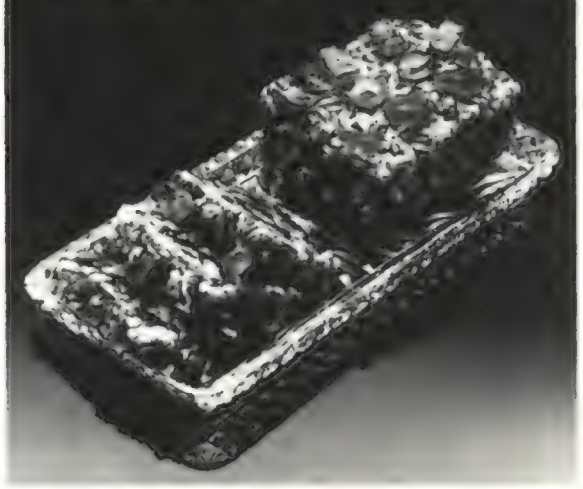

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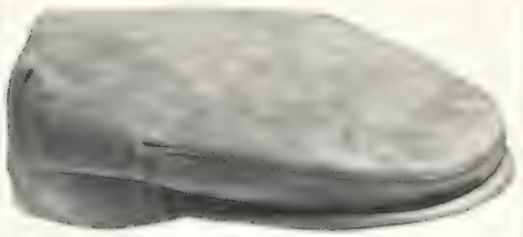

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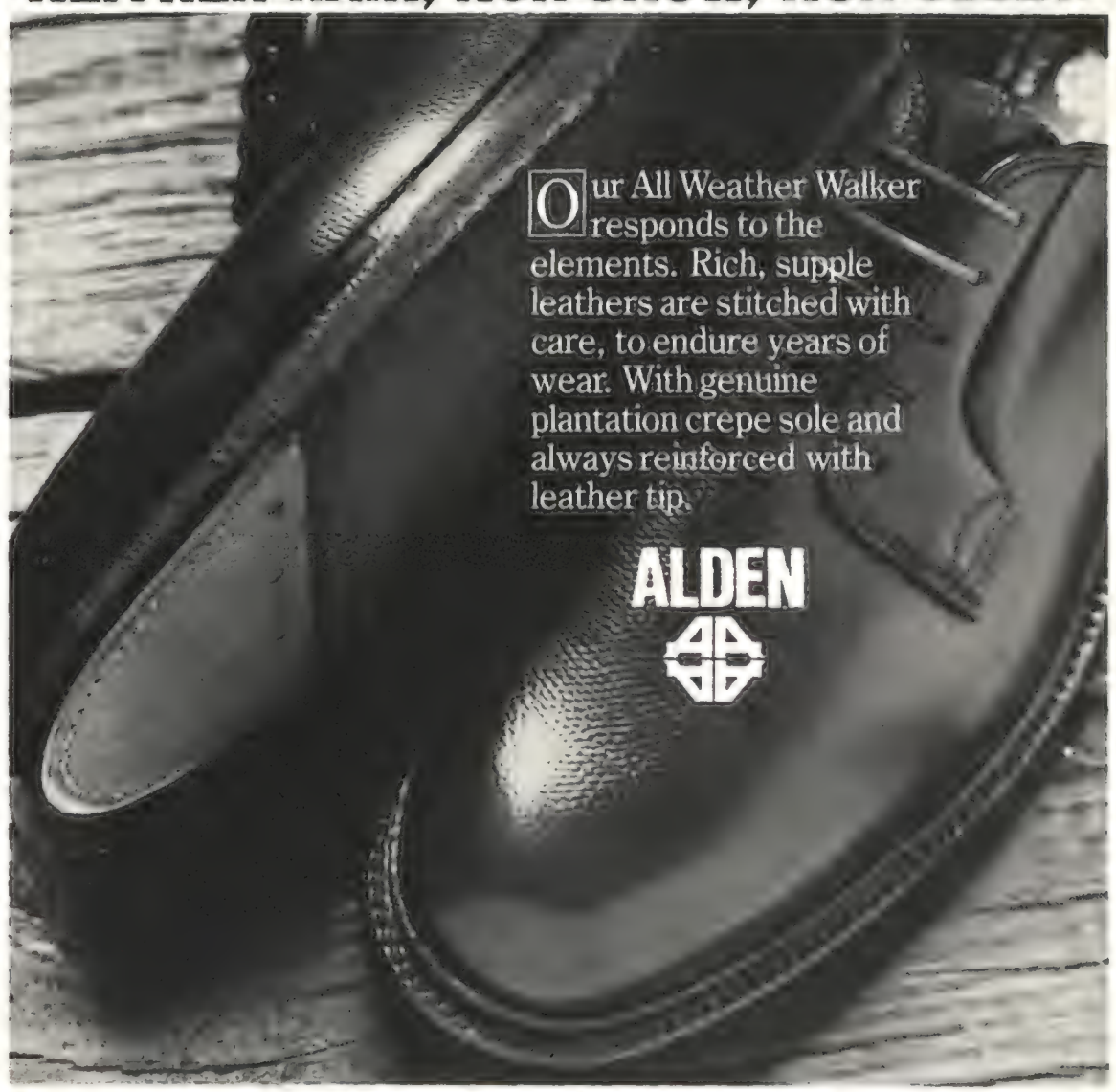
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Sir Edmund Hillary scaled Mt. Everest in 1953, plans to go back next year.

the animal's great eye opened only inches from his own. Dr. Richard T. Silver, a hematologist, visited a remote, inbred, genetically "pure" group of Indians in Brazil and sent mass blood samples back to New York. There, he and his associates identified a new gene now believed to be common in Asians.

A Manhattan psychiatrist, Dr. Joseph Lubart, combines psychoanalytic methods and anthropology. Lubart has worked among Eskimos in the Canadian Arctic, studying the psychological and social disturbances they experience when caught in a rapidly changing environment. He is looking into the characteristics of Eskimo culture that make them vulnerable and for ways to help such people make the transition to the jet age.

Lubart believes in science. "Proper science aims at establishing a frame of reference in which to see things. Sure, it's nice to go into a cave—or find a new tribe in New Guinea—but so what? What knowledge did you add?"

Plenty of men in the club, however, simply seek fascinating things to do. Take James Fowler, a board member, who developed an interest in animals, birds of prey and zoology in general on a Georgia swamp plantation when he was a boy. Fowler went to Africa as a young man to work on animal films and then went up the Amazon in 1959 to study the huge harpy eagles. He trapped three, trained them to fly like falcons and made the pilot film for television's *Wild Kingdom*

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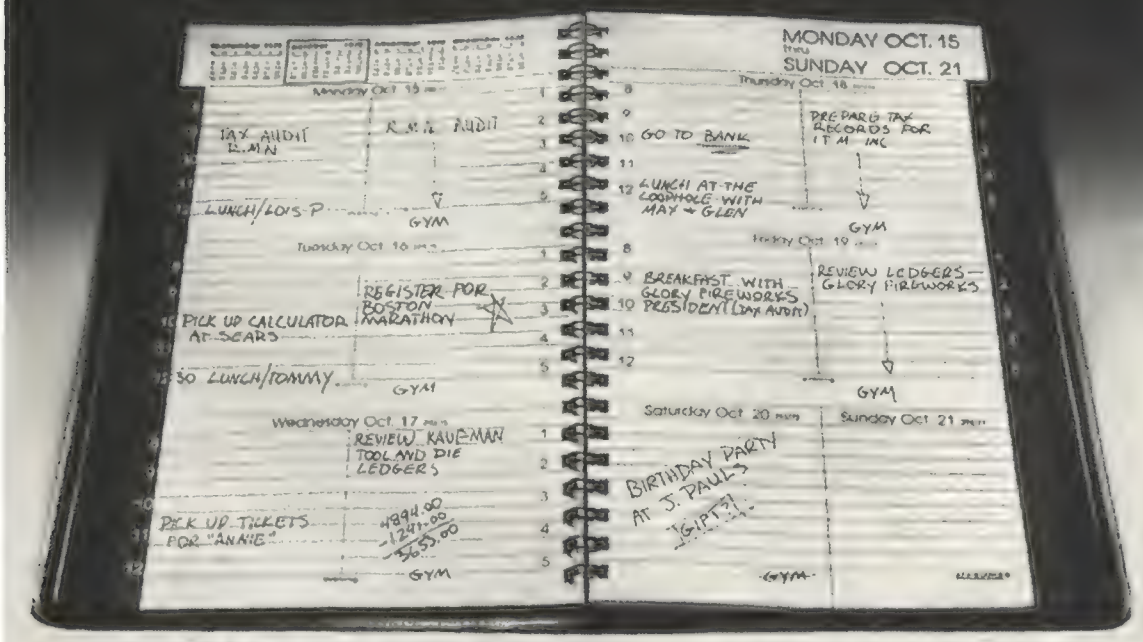

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series. He has been with the program and active in radio and television ever since, mixing zoology with show business.

Fowler once flew his eagles in the Waldorf-Astoria ballroom at the club's annual dinner—an evening made more memorable when one bird defecated with shotgun force on the front of Lowell Thomas' dinner jacket.

Norman Baker is another member with a sense of the unusual. He trained as an engineer at Cornell, worked in a flooded Alaskan gold mine and surveyed in the San Juan Mountains. He was on a marine biology expedition when he met Thor Heyerdahl in Tahiti. He was in New York in 1968 when Heyerdahl turned up again, talking about reed boats as they were made 5,000 years ago.

Heyerdahl wanted to show that such a boat could have sailed from ancient Egypt to the Americas. For how had the Americas been populated? Solely across the Bering Strait by men carrying the gene that Dr. Silver discovered? Then what about parallel myths and the leg-

World rover Lowell Thomas, surrounded by reportorial equipment, makes notes

ends of men with beards and pale skins? Transmitted through Man's collective unconscious? Possibly, but could a reed boat make the trip? They talked for six hours. Heyerdahl was going to try; would Norman Baker sail as navigator? So began the voyages of the *Ra,* abandoned in the mid-Atlantic with reeds awash, and the *Ra II,* which made the trip in 57 days and proved—what? Perhaps nothing, perhaps something splendid. Later, Baker joined Heyerdahl's reed-boat expedition down the Tigris to the Persian Gulf and the straits of Hormuz as far west as Djibouti. There, regional politics obstructed the journey and they burned the boat *Tigris* in protest.

For all the members' talk of science and sniffs at adventure, the Explorers Club seems full of men who want to do strenuous, unusual, worthwhile things in all parts of the world. Granted their serious research, think of sailing down the Tigris or crossing the Atlantic in a reed boat of a design 5,000 years old. What a grand thing to do!

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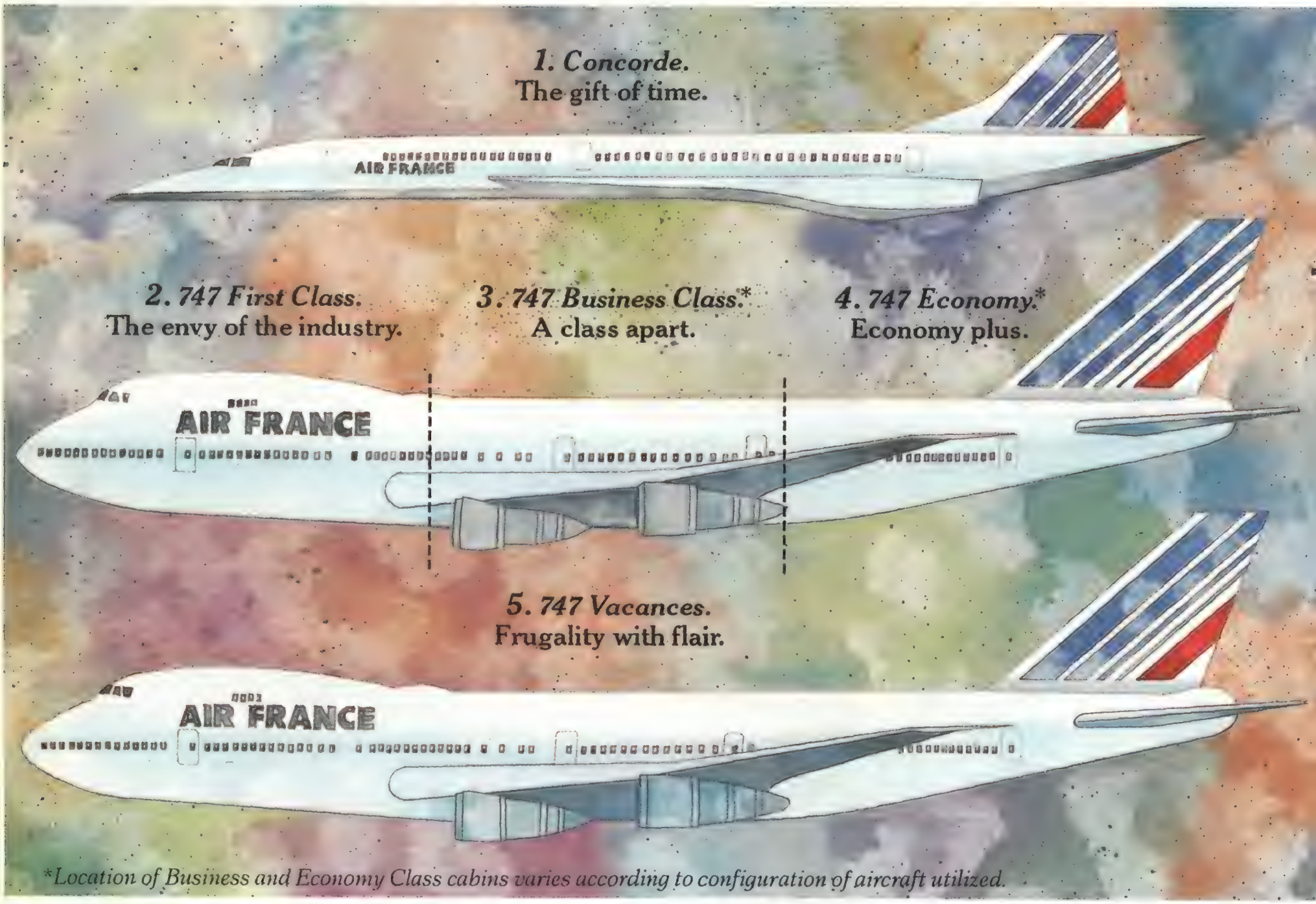

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AN UGLY *MUG* OF LOG-CABIN HARD CIDER

Pull the tab, and Martin Van Buren's joy turns to shock at Whig cider.

By William L. Bird jr.

Election gimmicks: always the fun and games of campaigns

Straw hats, banners, bumper stickers may seem silly now, but consider log cabins and cider barrels of 1840

Reagan stickers, Carter buttons, Anderson banners—they're so ubiquitous that we're numb to them. So it's easy to forget that election junk goes back to our roots.

After independence, two trends in the craft of political gimcrackery began to emerge. First, artifacts began to speak for the campaigners, not just commemorate them; second, durable, utilitarian goods began to yield to expendable things—ribbons, tokens, gimmicks like the pull card above, designed to carry on the strategy of the campaign and to become obsolete when it was over. Obsolete or not, many of these objects are at the Smithsonian, currently on display at the Museum of History and Technology.

Even before Washington's election a pitcher made in England was inscribed "J, Hanson and Trade for ever," honoring the first President under the Articles of Confederation and also the concerns of merchants who shipped such goods to the infant United States.

Clothing buttons marked George Washington's inauguration in 1789. They were mostly brass and copper, though accounts note that some were silver coated. One of these buttons carried "GW" stamped in the center with "Long Live the President." Washington apparently wore silver buttons decorated with the American eagle to his inauguration.

A Thomas Jefferson banner is of faded linen with the third President's

The author is a Smithsonian technician in the Division of Political History.

oval portrait surrounded by 16 stars and topped by an eagle carrying a streamer inscribed "T. Jefferson President of the United States of America." The streamer wraps around the eagle so that the other end of it has room to declare, "John Adams is no more."

By celebrating Jefferson's turn-of-the-century victory, the banner carries on with the 18th-century practice of commemoration in artifacts; by defaming Adams, it takes up the new 19th-century technique of using artifacts to campaign. Many of these campaigning objects borrowed symbolism in heroic proportions. The Congressional medal awarded Andrew Jackson for his victory at New Orleans inspired similar medals in the 1824 Presidential campaign when he first ran for the Presidency. Supporters of John Quincy Adams, meanwhile, used a ceramic plaque (probably based on a portrait) of Adams holding a parchment to project a figure of stature and authority.

Adams beat Jackson when the election was thrown into the House of Representatives, though the General won more popular votes. This prompted the creation of a stoneware crock incised by a New England potter with a ship, an American flag and the angry inscription: "25,000 Majority Gnl. Jackson." The sentiment foreshadowed the even more bitter campaigning that Jackson supporters would conduct for four years until they got him elected in 1828.

In that year, campaign items centered around Jackson's career in the War of 1812. Adams partisans countered with "coffin handbills" alluding to Jackson's part in military executions for insubordination and desertion. One lamented the

Western Reserve Historical Society

1840 banner combines Harrison (as hero) and a log cabin as a symbol of virtue.

Hard cider barrel, symbolizing the common man, adorns thorn wood cane.

English mugs were quickly decorated for market, often had errors like "Munroe."

Liberty, with staff and cornucopia, crowns victorious Washington on pitcher.

fate of John Woods, a 17-year-old recruit who threatened an officer with a gun during the war with the Creek Nation in 1814. General Jackson drummed up a court martial, and young Woods was executed. The description of his death and the grief of his mother, "Bereft of a beloved son," appeared on a coffin.

The Whig campaign of 1840 against incumbent Martin Van Buren established a pattern of determined, consistent campaigning from which later elections have seldom deviated. The symbols of log cabin and hard cider were the positive imagery which people quickly adopted.

There were the usual ceramics with transfer designs of log cabins, one with "To Let In 1841" on the door. Canes had miniature hard cider barrels for heads. Glassware, spoons, covered dishes, children's tea sets all declared for log cabins.

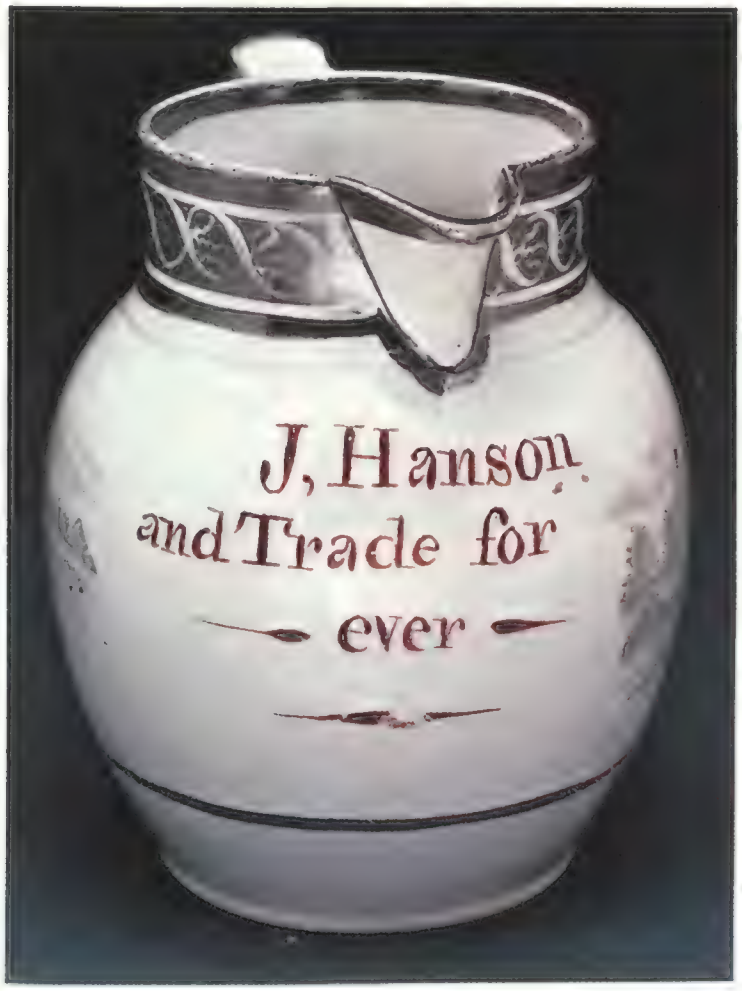
At the heart of the metaphor was Whig determination to play the political middle and offend no one. Despite the hard cider symbol, a temperance medal appeared, offering the pledge and linking up with the virtuous log cabin.

Appeals to voters emphasized William Henry Harrison's role as military hero. As Whigs assembled at Baltimore to ratify their national ticket, a ribbon appeared depicting the city's famed monument to Washington, Harrison leading a charge and also greeting a visitor to his log cabin —and inviting him in to have some cider.

Whig gatherings turned to songs. The Boston Harrison Club published and distributed copies of "Harrison Melodies." The Democrats, outdone, complained that "when they lay down the weapons of argument and attack us with musical notes, what can we do?"

Banner lauding Jefferson slams opponent with words: "John Adams is no more."

Sewing box says "Jackson Triumphant" on pincushion. He appears inside lid.



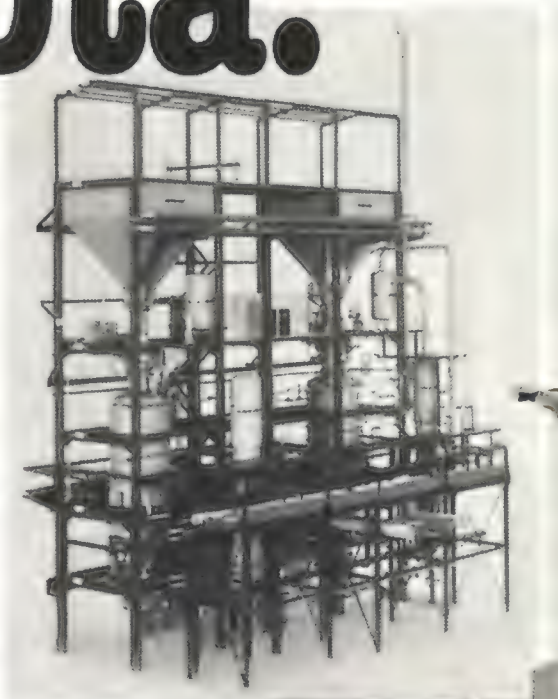
English pitcher, left, honored one Confederation President—and commerce.

This brass clothing button appeared in 1789, year of Washington's inauguration.

Ceramic proof from cookie mold boosts J. Q. Adams, but misspells "peace."

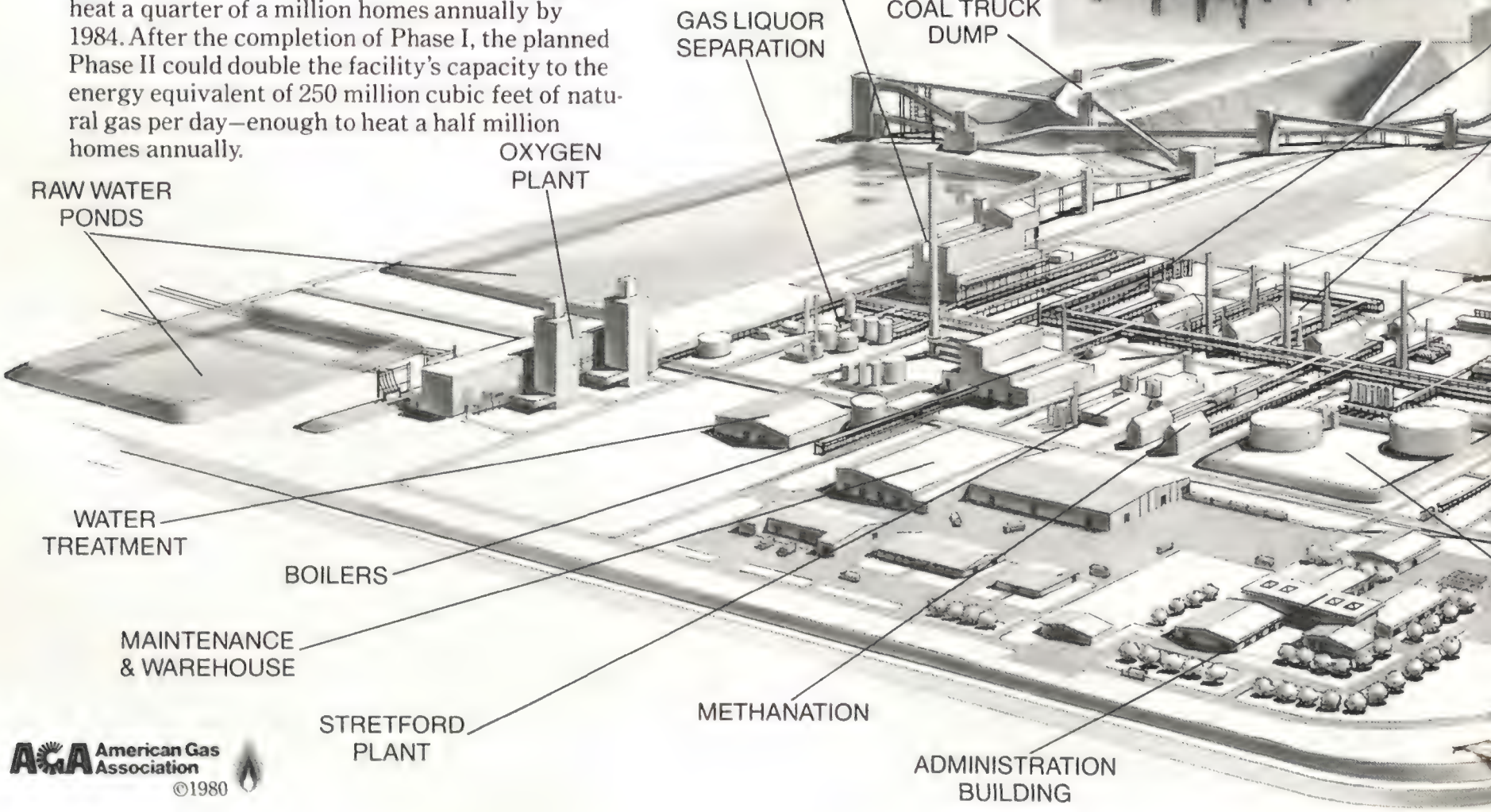
Exercising the Gas Option

Gas Update: Large-scale coal gasification begins in North Dakota.



The new coal conversion facility will gasify 14,000 tons per day of local lignite coal to produce approximately 125 million cubic feet per day of natural gas.

The first phase will produce enough natural gas to heat a quarter of a million homes annually by 1984. After the completion of Phase I, the planned Phase II could double the facility's capacity to the energy equivalent of 250 million cubic feet of natural gas per day—enough to heat a half million homes annually.



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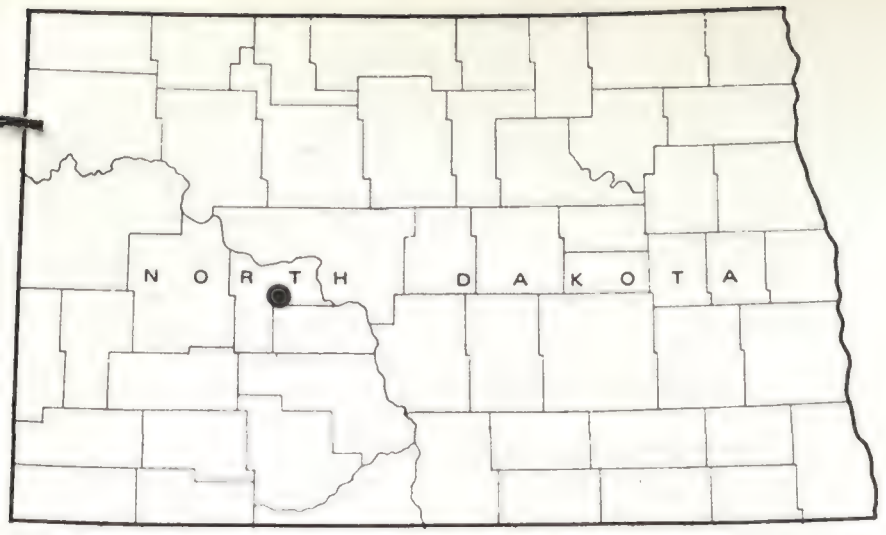


Great Plains project is near Beulah, North Dakota, as shown above. The venture is America's first large-scale synthetic fuels project.

A new era in energy began on July 28, 1980, with the announcement of our nation's first commercial-scale coal gasification project in Mercer County, North Dakota. The $1.4 billion plant will process local lignite coal into approximately 125 million cubic feet of clean gas energy every day—enough to heat a quarter of a million homes annually. Converting coal into methane gas is the cleanest, most efficient and economical way to use our nation's vast coal reserves. And after years of testing, development and evaluation, this process is ready for commercialization. Synfuel is becoming a reality.

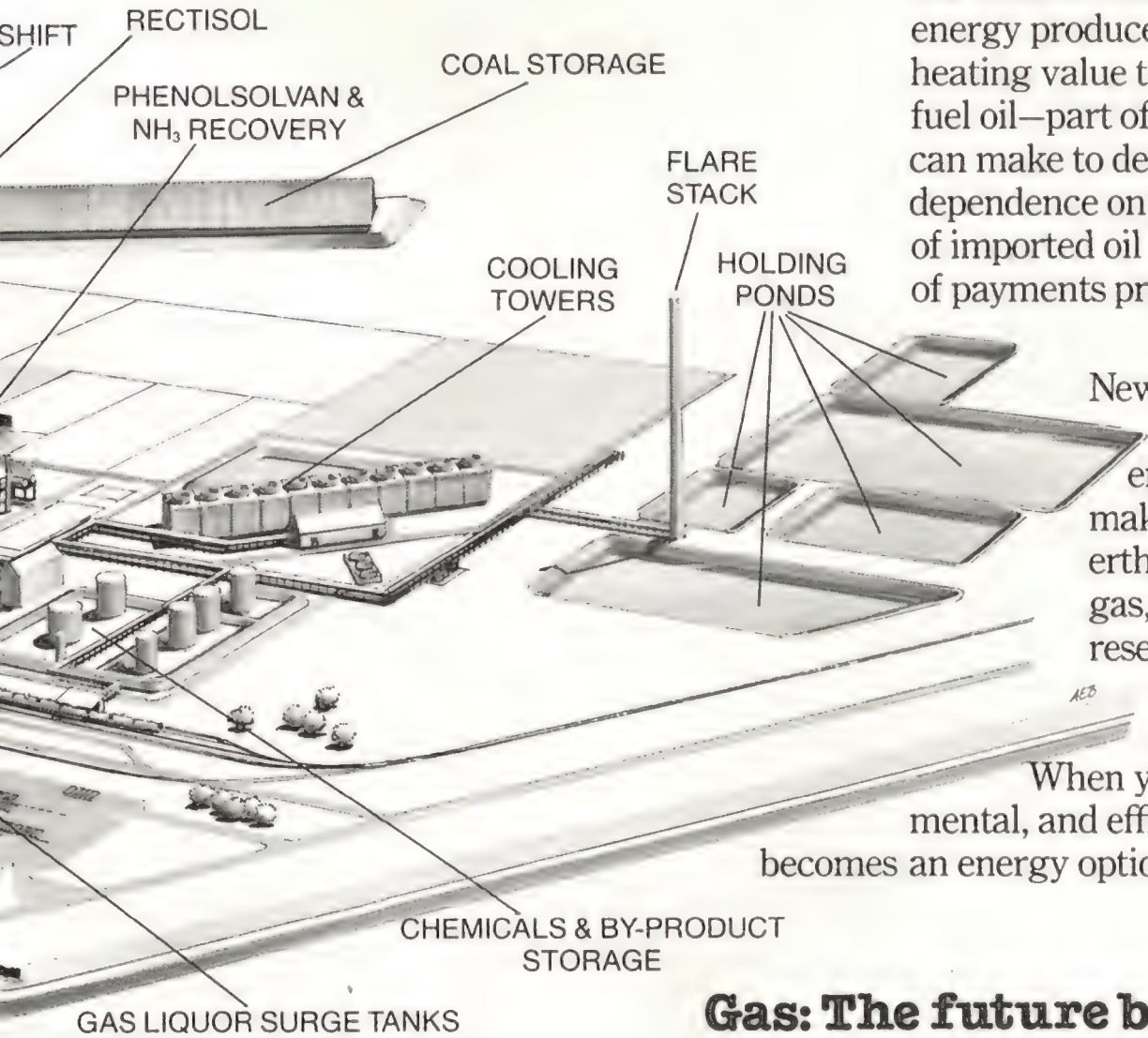
More Clean Energy for the Future

The project's administrator and plant operator, American Natural Resources Company, will share the gas produced with four other companies: Peoples Energy Corp., Columbia Gas System, Inc., Tenneco, Inc., and Transco Companies, Inc. The significance of the Great Plains project goes beyond processing 14,000 tons of coal into approximately 125 million cubic feet of gas every day. In demonstrating the feasibility of large-scale coal gasification in the U.S., the plant will provide a stream of valuable economic, environmental, and technical data for future projects of its kind.

This information is essential to the creation of an entire new industry based on the utilization of America's vast coal resources, the world's largest in terms of currently recoverable reserves.

Coal for the Great Plains project will come from four adjacent mining areas. Only 500 acres per year will be disturbed, and reclamation will be continuous.

Gas is scheduled to begin flowing in 1984. After that, the addition of a second phase could double the plant's capacity to the energy equivalent of 250 million cubic feet per day.



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New technologies like coal gasification will solve only part of America's energy problems. But they can make an important contribution nevertheless. Unconventional sources of gas, which additional expanded research can help make available, are potentially huge—and in some cases are virtually inexhaustible.

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In 1923, two years after oil was found in the Signal Hill neighborhood south of the city, this field was pouring out some 244,000 barrels every day.

By Charles Lockwood

In the Los Angeles oil boom, derricks sprouted like trees

It all began when Edward Doheny, later of Teapot Dome fame, chased a passing wagon loaded with pitch

With its endless freeways and far-flung suburbs, Los Angeles symbolizes America's love affair with the automobile and our voracious consumption of oil and gasoline. But only a few decades ago this was not yet true, and Los Angeles was an important oil-producing region. At the turn of the century more than 3,000 oil wells reared their bristling wooden derricks above the city, and in the 1920s Southern California produced a third of America's petroleum.

An unsuccessful gold and silver prospector named Edward Laurence Doheny quite accidentally started the Los Angeles oil boom in 1892. His cheek scarred and his wrist mangled from an attack by a mountain lion, the 36-year-old Doheny had less than $1,000 to his name when he drifted into town that year, but he had never lost hope of making the big strike.

One day Doheny was looking out the window of his boardinghouse and saw a passing wagon filled with chunks of a brown, greasy substance. Running after the wagon, Doheny asked the driver what the load was.

"It's breer," the driver replied, meaning *brea*, the Spanish word for pitch.

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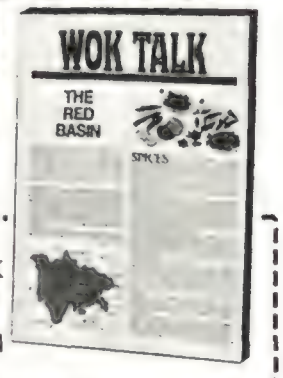

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Edward Doheny, grown old in 1930, was acquitted of Teapot Dome bribery.

"From near Westlake Park," the driver replied.

Doheny jumped on a streetcar and headed for Westlake Park, about a mile west of downtown.

There he found accumulations of the tarry brea, which local Indians once had used to waterproof their woven baskets and caulk their canoes. More recently, Mexican and American settlers had collected the brea to waterproof roofs and fence posts, lubricate machinery, even burn as fuel.

Doheny correctly guessed that brea was oil that had seeped out of the ground and slowly thickened on contact with the air, just as pine sap turns into resin on a tree trunk. These oil seepages, he figured, indicated vast untapped pools of oil beneath Los Angeles.

But why hadn't someone already done something about this? After all, oil had been pumped out of Pico Canyon, 30 miles north of Los Angeles, for several years. Doheny decided that the Indians and Mexicans had not drilled for oil because it wasn't valuable enough in their hunting and agricultural economy. Later settlers probably thought the seepages weren't worth much, because no one *had* done anything about them.

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And the greatest potential for improvement is on publicly held land.

So that means the nation needs to establish policies and take actions to encourage productivity — not only in the National Forests but in other forests as well.

If you'd like to be better informed on how important it is to keep America's forests productive, write American Forest Institute, P.O. Box 873, Springfield, VA 22150 for a free booklet, "The Great American Forest."

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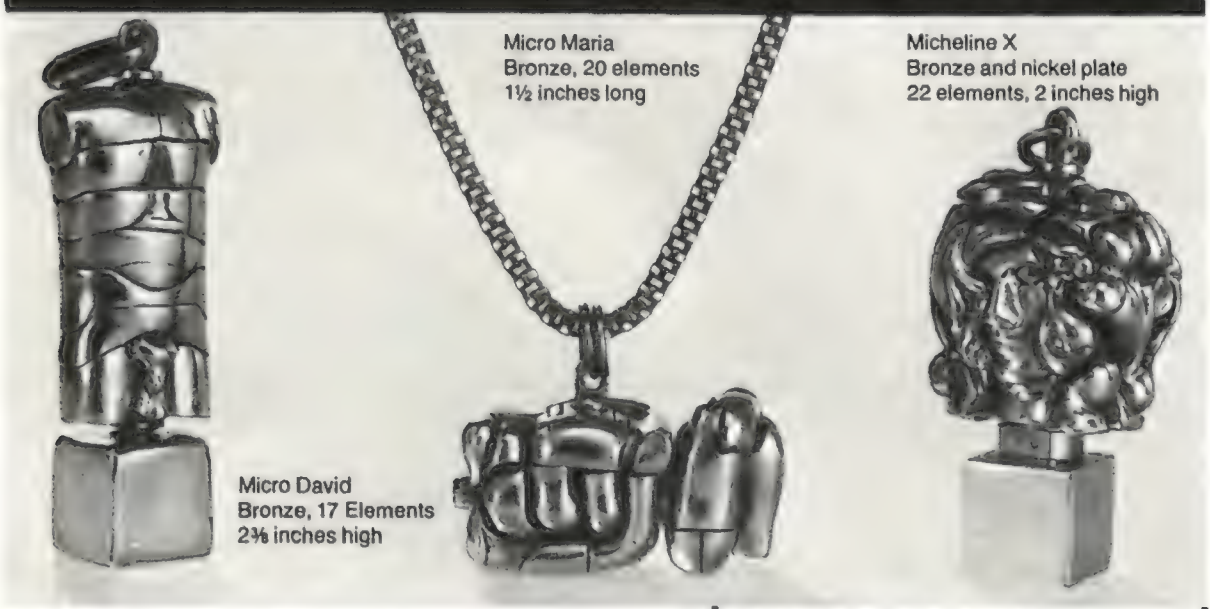

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The Los Angeles oil fields in 1895, when more than 80 wells pumped away

Doheny looked up his old mining partner, Charles A. Canfield, and they scraped together $400 to buy an empty lot at Colton Street and Glendale Boulevard, in a residential neighborhood near the downtown business district (and about eight miles from the now famous La Brea tar pits). Knowing next to nothing about oil exploration, Doheny and Canfield dug a five-by-seven-foot mining shaft with picks and shovels to a depth of 155 feet. Then they cut down and made a pole from a 60-foot-tall eucalyptus tree which they sharpened into a makeshift drill.

On November 4, 1892, the two grimy prospectors struck oil at 460 feet. They were elated. At first nobody else in Los Angeles got excited. The well delivered only seven barrels a day, which Doheny and Canfield bailed out with a bucket.

But when the flow jumped to more than 40 barrels a day, all Los Angeles started talking. Were there substantial oil deposits under their town? Suddenly everyone decided that his home or ranch was sitting over a fortune in black gold. The Los Angeles oil boom was on, and it was going to be every bit as exciting—and tumultuous—as the Gold Rush of 1849 in Northern California.

Wildcatters swarmed into Los Angeles, looking for land to lease and wells to

in 20-block area around discovery well at Colton and Glendale Boulevard.

drill. Homeowners trampled their gardens, ripped out backyard palm trees, even tore down their houses to make room for drilling rigs and oil derricks. A few dug their wells with the newly developed steam-powered standard rig. Others used picks and shovels or the "spring pole" method, repeatedly dropping a sharpened cutting tool into the ground, pulling it out, then letting it drop again.

In all the rush and excitement, some inexperienced drillers got their wells tangled up with a neighbor's and had to back off and drill again. One Los Angeles homeowner installed a drilling rig in his backyard only to realize that he didn't have any place to dispose of the waste water and mud coming out of the ever-deepening shaft. Rather than lose precious time hauling the mud away, he simply dumped it into his basement.

By the end of 1894, two years after Doheny's discovery, more than 80 wells were producing oil in the 20-block area bounded by Figueroa, First, Union and Temple streets, surrounding his discovery well. By 1897 that number had jumped to 500, and sometimes four or five derricks stood

The author, long transplanted from Washington, D.C., to California, wrote of Venice in our March 1980 issue.

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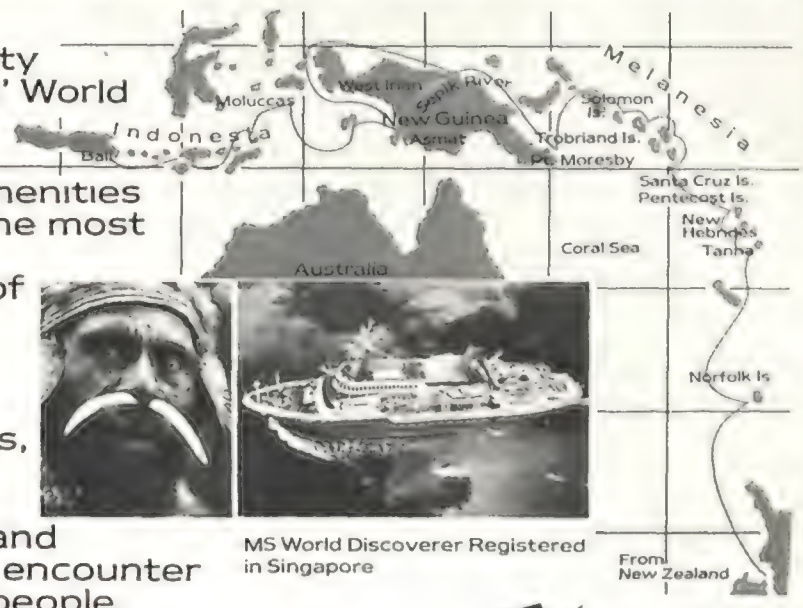

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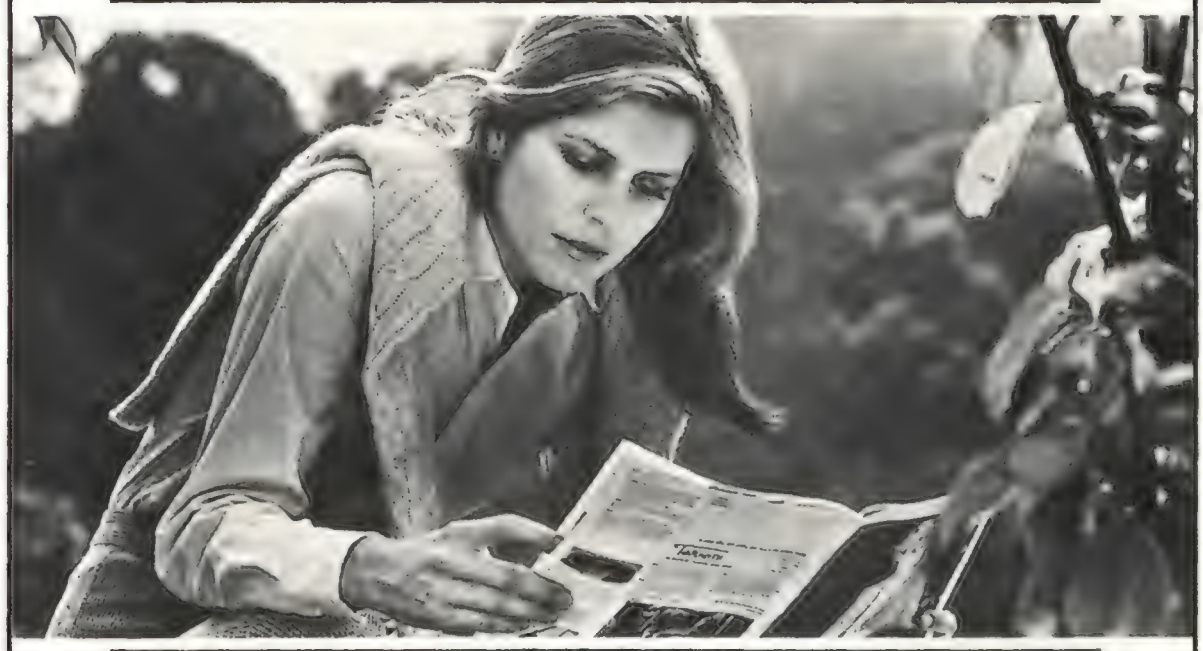

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These drillers used the crude "spring pole" method, repeatedly dropping on a single 50-by-150-foot lot. According to local legend, one man dropped a set of tools down one of his wells but retrieved them from another one nearby.

Some of these early Los Angeles wells were as shallow as 200 feet, and the cost of drilling, a rudimentary pump, and several redwood storage tanks ran about $1,500. At the beginning of the boom, a barrel of oil fetched $1 to $1.25, and a properly managed well yielded about 10 barrels a day. By saving the profits from one oil well, fledgling operators made enough money to buy more land and drill again.

Because oil looked like the easy road to riches, the wildcatting quickly spread beyond the original field. By 1897 another 2,000 wells had been drilled in a half-mile-wide, several-mile-long area stretching south and west from Elysian Park to Vermont Avenue.

With so many wells pumping, the Los Angeles output reached 2,000,000 barrels a day early in the century. For a while after Doheny's 1892 strike, supply outstripped demand and the price for a barrel of oil fell to 30 cents—and sometimes dipped as low as ten cents—because nobody knew what to do with it all.

a cutting tool into their hole and laboriously pulling it out by hand.

Southern California, indeed the entire western United States, could use only so much oil to creosote fence posts and lubricate machinery, and the handful of automobiles then on the roads didn't consume much. So the oil producers embarked on a desperate race to find new markets for petroleum before the industry drowned in the ever-rising tide of almost worthless California crude.

One summer, Los Angeles City Hall had an idea. Why not spray oil on unpaved streets to hold down the dust? The oil did just that—and it also turned the streets into a gummy black mess that stuck to carriage wheels and everyone's shoes. More practical minds discovered other markets. But Southern California towns began to use asphalt, a petroleum byproduct, for street paving after a trial run in Los Angeles in 1895. In 1902 an experimental oil burner was successfully tested in the Hamburger Building downtown, and oil became a popular source of heat during the damp winters.

Railroads and industry soon emerged as the most important market for oil. In a state without any coal, millions of barrels of cheap oil became a blessing. At the

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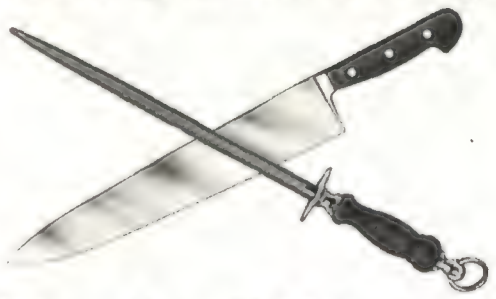

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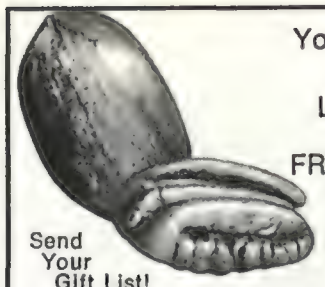
turn of the century, imported coal from Washington State, British Columbia and Australia cost $7 to $11 a ton in Los Angeles, compared to $1.50 to $3 a ton in cities back East. The Southern Pacific and Santa Fe railroads switched their locomotives from wood and coal to oil and consumed an estimated 10,000,000 barrels by 1903. The savings for the Southern Pacific line alone amounted to $4,000,000 a year. And the access to all this oil, plus plenty of low-paid nonunion labor, started to attract industry to Los Angeles. Between 1890 and 1900, industrial output increased 115 percent in Los Angeles while it declined two percent in San Francisco.

Despite these new markets, the demand still did not keep up with the ever-increasing supply. Because of more and more oil strikes outside Los Angeles, production in Southern California leaped from some 4,000,000 barrels in 1900 to 77,000,000 in 1910. Oil prices seesawed up and down, wiping out overextended oil men, often making small fortunes for speculators who bought out busted operators on the cheap and waited until prices rose again.

But the public's fascination with oil remained constant. Whenever a strike was announced in or near Los Angeles, thousands flocked to the field, waiting to see a gusher for themselves and hoping to get a piece of the action before it was too late.



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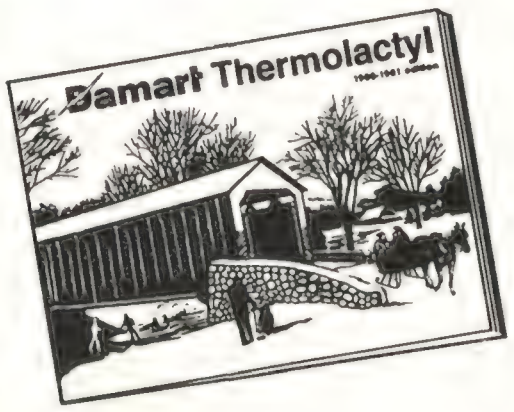

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Long before pipelines retired them, oil wagons drawn by horses were

Usually the wheeler-dealers already had arrived on the scene and covered the surrounding land with signs saying: "Petropolis Co-operative No. 1" or "Grandview Syndicate No. 1: 10,000 units at $10."

These smooth-talking promoters busily auctioned off oil lands and leases from the back seats of their open cars and in large tents that had once sheltered revival meetings. More often than not, the public syndication shares proved worthless except to the promoters, who often made more money trading pieces of paper back and forth than the oil operators who extracted the black gold from the ground.

But some oil operators did all right for themselves, and one of the most successful was a woman named Emma Summers. A native of Kentucky and a graduate of the New England Conservatory of Music, Emma Summers had gone to Los Angeles in 1883. She taught music and occasionally invested in real estate. Like many other Angelenos, Emma was smitten by the oil boom in the early 1890s, and paid $700 for a half-share of a well to be drilled in the original field near Court and Temple streets. After her first well came in, Emma Summers drilled another and yet another, buying the tools and supplies herself, hiring the workmen, even overseeing the actual drilling and pumping. When her workmen quit in the evening, she headed home and taught music to earn more money for her investments.

Her hard work paid off. Within a few

a familiar sight around Los Angeles.
But dripping oil softened the hooves.

years, her wells brought in so much oil that she also went into refining and wholesaling. By 1900 she controlled half of the production in the original Los Angeles field, and she sold more than 50,000 barrels a month to downtown hotels, factories, the Pacific Light and Power Company, as well as several Southern California commuter railroads and trolley lines. Emma Summers was known, of course, as the Oil Queen.

In the meantime, Edward Laurence Doheny had become rich and powerful. After making their first strike, he and Charlie Canfield brought in dozens of wells throughout Los Angeles, then made even greater finds outside the city in Fullerton and Bakersfield. In 1900 Doheny and Canfield discovered vast untapped oil reserves near Tampico, Mexico. With millions of dollars at their disposal, they cleared the jungle and built roads, docks, railroads, warehouses, pipelines, even complete workmen's villages. The first well they drilled pumped 15,000 barrels a day, and their first gusher, Casiano No. 7, poured 402,000 barrels into the air before it was brought under control.

Yet even phenomenally successful operators like Doheny and Canfield sometimes had bad luck. In 1906 Charlie heard about an oil strike in the village of Sherman, now West Hollywood. Charlie formed a syndicate with Burton Green and Max Whittier, and the three oil men bought the Rancho Rodeo de las Aguas,

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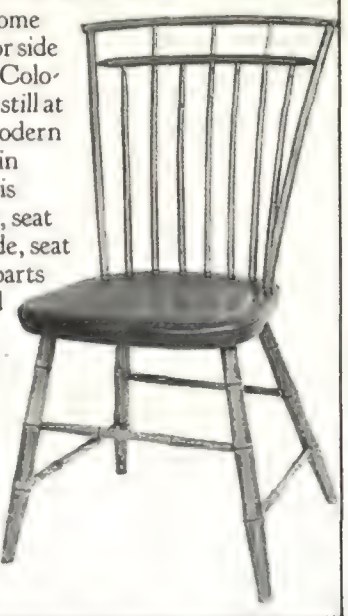

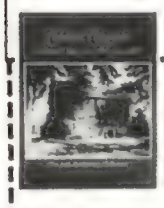

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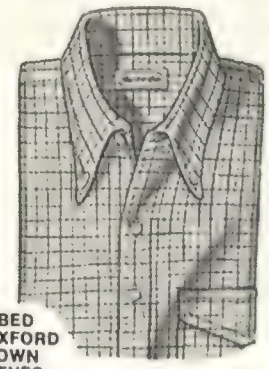

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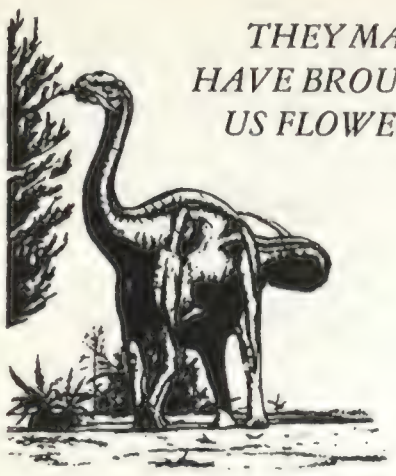

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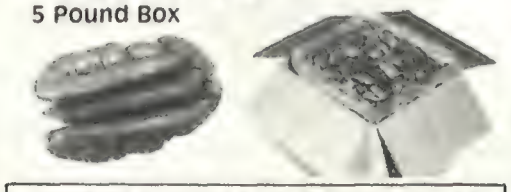

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up city streets. And the blocks off Santa Monica Boulevard, near Vermont Avenue, had become a raucous oil workers' shantytown. The saloons were busy 24 hours a day. Prostitutes often plied their trade from temporary shelters made from canvas stretched over wooden poles. Gamblers worked out of two-room shacks, with a pool table and tobacco counter in the front and pinball machines, card games and a quick exit in the back.

These abuses flourished because the city hesitated to clamp down on the oil industry. As Mayor Meredith P. Snyder declared in 1897, "This is one of the leading industries in the city, and all legislation bearing on it should be liberal." Besides offering low-priced fuel for new local industry and providing thousands of jobs, the oil boom generated the capital to build homes and open streets, bring desperately needed water hundreds of miles to Los Angeles from the Owens River Valley, and develop an ocean port 25 miles south of the city at San Pedro. These were prosperous years for Los Angeles, and the city's population jumped from 50,395 in 1890 to 102,479 in 1900 to 319,198 in 1910.

When the city council did vote to cur-

Fires—like this in 1928 at Santa Fe Springs—were constant hazard.

NPR Science Correspondent Ira Flatow in Antarctica.

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tail new drilling in built-up neighborhoods, the ordinances were next to useless. Oil operators simply filed permits to drill water wells. What could anyone do if they struck oil instead? And the city council did not seriously restrict existing fields or improve the incredibly careless way the petroleum companies went about their business.

Who cares if you spill a little?

One day a man approached the owner of an oil field on the hill above Beverly and Glendale boulevards about buying one of his wooden storage tanks. They quickly agreed on the price for one large redwood tank. But it was half full of oil, and the purchaser needed the tank at once. Rather than lose the sale, the owner opened the valve and drained all the oil into the intersection below.

When the price of oil was 10 or 25 cents a barrel, who cared if you spilled a little? But spill is hardly the right word to describe what was happening in Los Angeles. At times, the industry wasted more oil than it sold. Wagons filled with poorly sealed barrels literally dripped their way from wells to the refineries. When producers ran out of space in their redwood tanks, they stored the excess in earthen reservoirs or in gullies, which overflowed onto nearby streets and lawns during the winter rains. So much oil drained into Echo Park Lake in 1907 that it caught fire and burned for three days.

During the 'teens, the Los Angeles oil industry finally began to mend its profligate ways, because city regulations had become tougher and oil prices were rising. The railroads and local industry bought more and more oil each year, and California crude helped meet the Allies' enormous petroleum needs during World War I. Also, between 1915 and 1920, the number of automobiles in California jumped from 150,000 to 500,000, and each vehicle burned plenty of gasoline and oil.

At the end of 1919, California motorists got a rude shock, a gasoline shortage. Many older wells had been all but exhausted during the around-the-clock wartime operations, and local gasoline production had not kept up with the rising postwar demand. But Los Angeles motorists avoided genuine hardships—and service-station lines—when trains rushed millions of gallons of gasoline to Southern California from Wyoming, and later from

Oilman Harry Sinclair got Teapot Dome leases by paying off Albert Fall.

Texas. As the *Los Angeles Express* reported on July 27, 1920, the first train's entry into the city "was heralded by Mayor Snyder, who rose early and journeyed to the outskirts of the city to hop aboard the locomotive and ride it into the station, where cheers reminiscent of a political rally welcomed the precious fluid."

Any lingering danger of gasoline shortages in Los Angeles vanished after the massive oil strikes just south of the city at Huntington Beach in 1919 and at Signal Hill and Santa Fe Springs in 1921. These fields dwarfed the Los Angeles field. In 1923 Huntington Beach produced 113,000 barrels a day, Santa Fe Springs 32,000 barrels and Signal Hill 244,000 barrels.

The scene at these three oil fields almost defied the imagination. In Hell's Half Acre at Santa Fe Springs the wells were drilled so close together that the derrick legs interlocked and men walked from one rig's platform to another without touching the ground. At Signal Hill on windless days, the steam pouring out of the drilling rigs shrouded the field in man-made fog. Sometimes genuine ocean fog held the natural gas so close to the ground at Signal Hill that automobiles accidentally set off explosions as they passed through gas-filled viaducts.

In the midst of this spectacular production, several scandals engulfed the Los Angeles oil industry. The first to break was Teapot Dome, and the participants included none other than Edward Laurence Doheny. After President Warren

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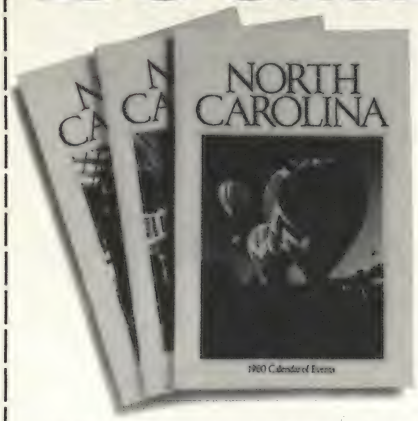

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A 1924 *Life* magazine cartoon of the oil scandals was captioned:

G. Harding ordered control of the U.S. oil reserves transferred from the Navy to the Department of the Interior, Interior Secretary Albert Fall granted oil man Harry Sinclair 20-year leases on the Teapot Dome field. Shortly thereafter, Fall leased the Elk Hills reserve to Doheny. When it later became known that Fall had accepted loans from the two men amounting to some $400,000, his insist-

"The Senate: If this thing grows much bigger I may have to drop it."

ence that the money had not influenced his official conduct was not convincing. He was convicted of accepting a bribe, and went to jail. Doheny and Sinclair, however, were acquitted.

In time, the Depression ended the excitement and get-rich-quick mood of the Los Angeles oil boom. Throughout the 1930s, however, the oil wells kept pumping away, even though they were

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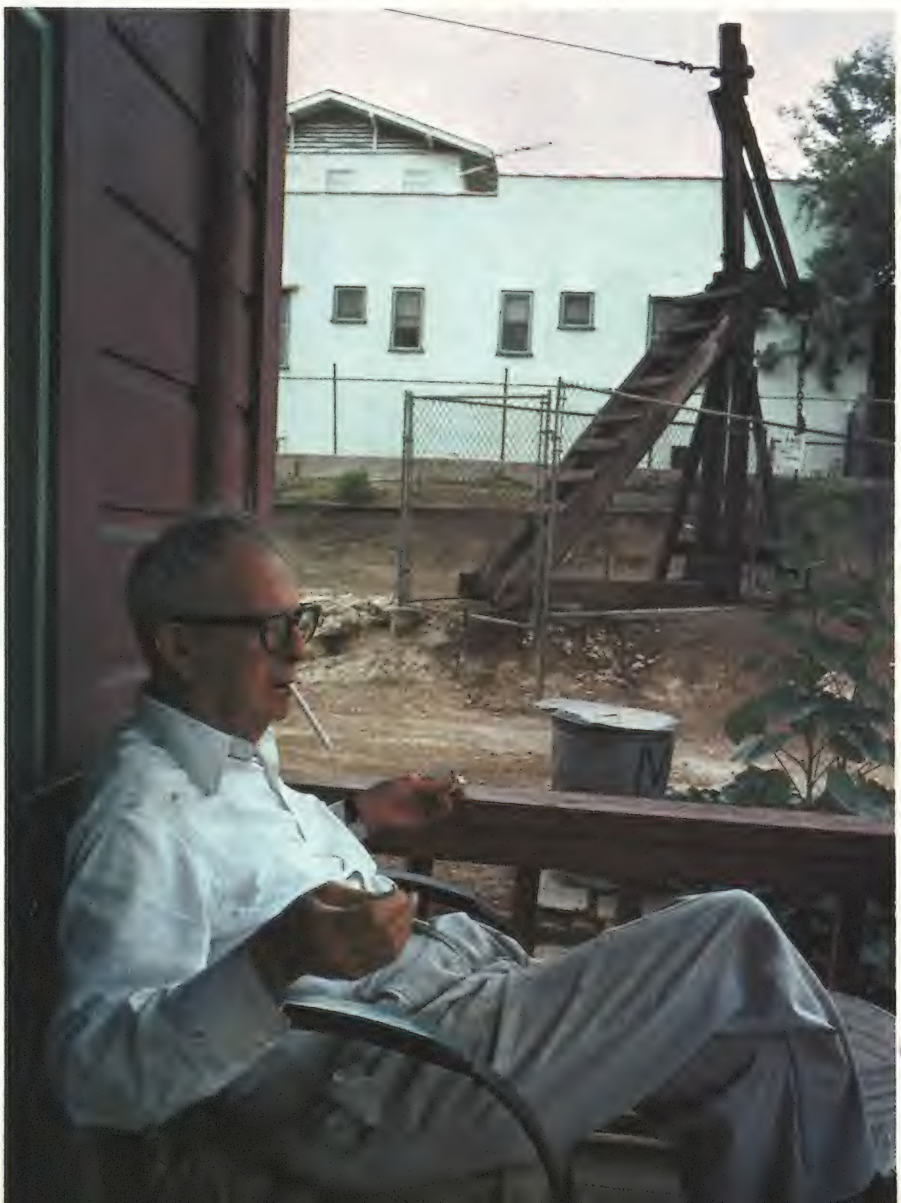
producing more than the Depression market could absorb. But the excess capacity came in handy during World War II, and California's oil production continued to grow in the postwar boom, peaking at 365,000,000 barrels in 1953. That year California became a net importer.

Today Los Angeles produces about 14,500,000 barrels a year from 500 wells scattered all over the city. Production may be on the increase once more. Chevron USA recently discovered oil at the Pacoima Field in the San Fernando Valley. There is talk of exploration in Boyle Heights, east of downtown, and at the Riviera Country Club in Pacific Palisades.

Surprisingly, the original Los Angeles field still pumps some 50,000 barrels a year from about 40 wells, all of which predate 1910. The field's largest operator is the Manley Oil Company, a third-generation family firm now run by Kenneth Manley. An outgoing, heavy-set man, about 60, Kenneth Manley refines and sells oil from his family's 16 wells in addition to maintaining most of the other wells in the field for owners who prefer to market their own California crude.

Several Manley wells still stand next to the old family home on Rockwood Street, where Kenneth's brother Orville now lives. The old wells now yield only two or three barrels a day, and the pumps are turned off in the early afternoon because the wells have gone dry for the day. But the Manleys are still the lucky ones. With today's high oil prices and the ever-present threat of gasoline shortages, who wouldn't be happy to have an oil well in the backyard?

From his back porch on Rockwood Street, Orville Manley, the grandson of an early oil developer, can look out on family wells that still produce.



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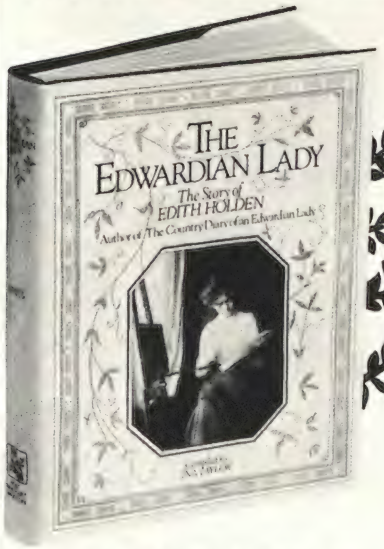

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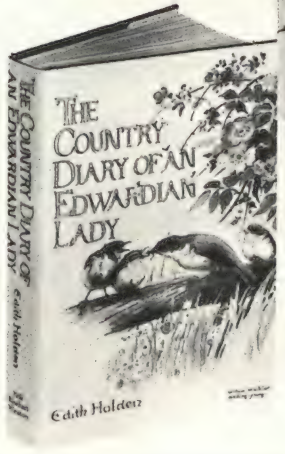

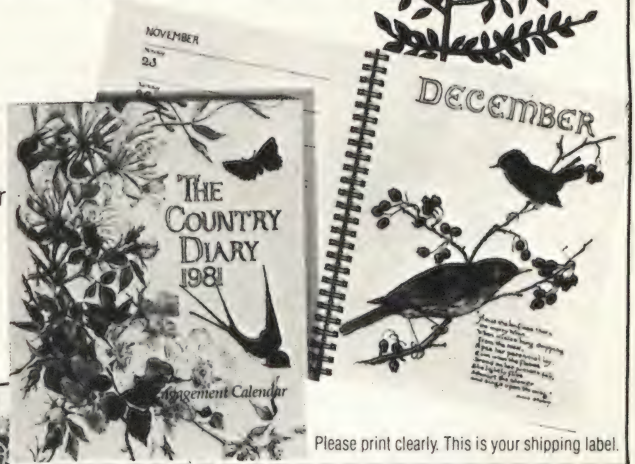

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Book reviews

The Paintings of James McNeill Whistler
Andrew McLaren Young, Margaret MacDonald, Robin Spencer, with the assistance of Hamish Miles
(Published for the Paul Mellon Centre for Studies in British Art by the Yale University Press, $125; $150 after December 31, 1980)

In the popular view of it, Whistler's story has got in the way of Whistler's art. The fact that his life is one of the most readable among those of the artists, and his personality theatrically entertaining enough to be orchestrated as opera, has tended to eclipse the high quality of his work, the considerable stature of his contribution to 19th-century world art.

There are good enough reasons for this: his wit, acerbity, elegance, love of women and pugnacity made him, in a city which had high regard for such things (London, of course), stand out in a gallery of eccentrics, all burning brightly in the late Victorian-Edwardian eras before World War I put the lights out.

But it is the other side of Whistler that is so superbly presented here: the artist. Whistler can take his place with the other two Americans of very great significance in world cultural history who lived in England, Henry James and T. S. Eliot. From England we received W. H. Auden (fair enough) and John Lennon. They still owe us.

He was born in Lowell, Massachusetts, in 1834 to Major George W. Whistler, civil engineer, and Anna M. McNeill, also known, indelibly, as *Arrangement in Grey and Black: Portrait of the Painter's Mother*. He began drawing, beautifully, as a boy in St. Petersburg, where his father helped to engineer the St. Petersburg-to-Moscow railroad. He went to West Point and was at the top of his class in drawing, but was discharged for lack

Whistler's Peacock Room at the Freer houses *Princess from the Land of Porcelain.*

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of comprehension of chemistry. He made maps for the U.S. Coast and Geodetic Survey but gave that up for the livelier prospect of studying art in Paris, arriving in 1855 at age 21. He worked hard at his art, then went to live in England where his half-sister Deborah had married Francis Seymour Haden, surgeon and excellent etcher. He moved back and forth between Paris and London frequently. In 1859 he showed at the Royal Academy in London. His work had already been accepted at the Salon in Paris. The great days had begun. He became one of the leading and most controversial artists of the time. England became his home. He loved and hated the English. They reciprocated instantly.

He painted portraits of the wealthy, but also "symphonies," "nocturnes," "harmonies." A painting for him was an ordered arrangement of shape and color and design, something he made for itself, not as a description of a place or thing. A revolutionary idea for the time.

He came into the news, published his corrosive comments on critics as the *Gentle Art of Making Enemies.* Not so gently he knocked his brother-in-law Seymour Haden through a plate-glass window in Paris. It was some time before his sister would speak to him again.

He made money. He lived stylishly. In 1877 he sued the overwhelmingly influential critic, author and messianic moralist John Ruskin for writing of his painting *Nocturne in Black and Gold: The Falling Rocket* that he "never expected to hear a coxcomb ask two hundred guineas for flinging a pot of paint in the public's face." He won the case, but even so was vindictively awarded only a farthing in damages, without costs. The expense of the notorious trial bankrupted Whistler and he was forced to auction his art, his porcelain and his furniture. He destroyed many of his paintings to keep them out of the bailiff's hands. For the rest of his life he moved around from place to place, painting steadily. He was at the center of things always. People in the know knew about Whistler. He died in 1903 and is buried in Chiswick Cemetery, London.

In 1905 about 750 of his works were exhibited at a memorial exhibition of paintings, drawings, etchings and lithographs in London, and another 440 at the Ecole des Beaux-Arts, in Paris.

The portrait of his mother is today in the Louvre. It is, in spite of its wide

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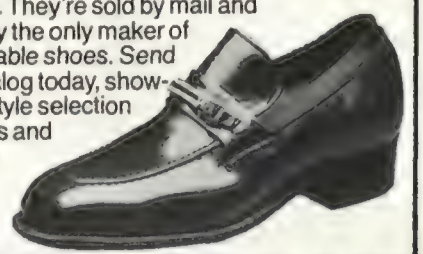

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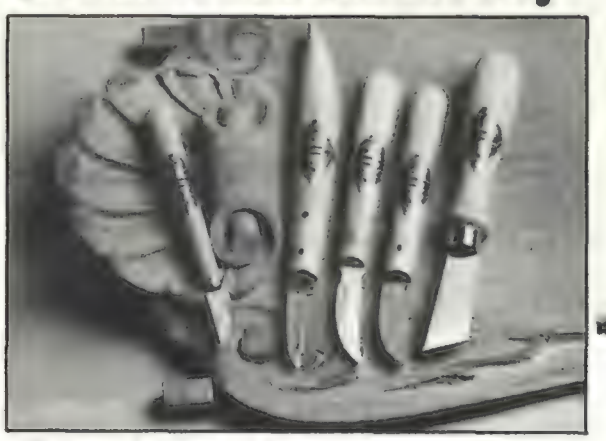

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popularity and the jokes about it, a great painting for itself and a superb portrait as well. The title is one of the better ones in all of art history. It is nice to note that he sometimes got as well as he gave. Several months after the sale of the painting to the French government in 1891, he was elevated to the order of Officer of the Legion of Honor. When the painter Fantin-Latour, an old friend, met Whistler in the Louvre, he touched the red ribbon in his buttonhole and said, "It was for this you sold your mother."

The great Whistler collections today are at the Smithsonian's Freer Gallery in Washington, and in a special gallery, opened in June at the University of Glasgow, which received a huge Whistler bequest from his sister-in-law and executrix, Rosalind Birnie Philip.

The Mellon/Yale *Whistler* is in two superbly produced volumes, the first of text, now, incontestably, the definitive word on the subject; the second containing 123 color plates and 313 black-and-white reproductions. Twenty years of impeccable scholarship went into the undertaking, begun by Andrew McLaren Young, who died in 1975. Every painting of which there is a record is included and described in the most careful detail. For all that, reading the history of a painting is fascinating and going from a plate to the text is a great pleasure, at once an experience of learning and a delight. Pictures have lives as well as painters.
—Bennett Schiff
Board of Editors

Unmentionable Cuisine
Calvin W. Schwabe
(University Press of Virginia, $20)

Calvin Schwabe has set a new publishing standard with a scholarly and entertaining cookbook that will make many of his readers sick.

Despite its title, the book mentions nearly everything but what South Sea cannibals used to call long pig—missionaries and other interlopers. The recipes include boiled dog and steamed cat, caterpillars and stewed rat, pig ears and baked bat and almost every other common fish, crustacean, bug, bird and beast on the planet. The author isn't kidding about any of them and has impressive credentials, being a professor of veterinary and medical science at the University of California at Davis and a member of several

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international committees on nutrition and food production.

He asserts that there would be much less hunger and far more delight in this world if it were not for food taboos and prejudices. The Masai drink blood drawn from living cattle, but won't touch chicken. If Jews and Moslems agree on anything, it is that pigs aren't fit to eat. Americans gag at goat. No other major society is so narrow-minded as ours about what is edible, Schwabe says. Our diet is declining to bland convenience foods and beef, especially "the homogenous paste we call hamburger."

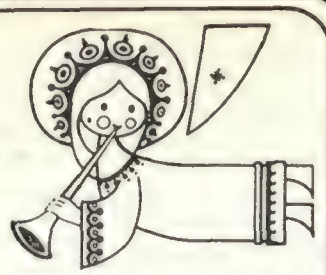
Schwabe does not expect many of us to acquire a taste for horsemeat or to take up eating dogs and cats. But he does hope to entice us to try such things as giblets, game and lamb, which have all but vanished from the American table.

Ethnic diversity has not made us more open to "odd" foods, Schwabe says, because culinary traditions are no match for the pressures toward conformity so magnified by modern merchandising. At the turn of the century one in four *Good Housekeeping* recipes was for game and/or organ meats such as tripe; now it's about one in 40. And these days items like lights (lungs) and sweetbreads (thymus) are often hard to find.

An aversion to rotted yak milk is understandable, but some of our prejudices are astounding. Sheep are among the world's main meat animals, yet most Americans consume less than two pounds apiece annually. Not only are we beef crazy, we eat mainly steaks, roasts and hamburgers, Schwabe mourns, consigning the organs and other parts to pet food and fertilizer. The author shows how to cut the cost of beef to about a dollar a pound by eating nearly everything but the hooves, horns and hide.

The book is full of surprising (to us) facts and fascinating discussions of creatures and cultures, but is meant above all to be a practical guide. Even novice cooks will find the recipes easy to follow and hard to resist. Schwabe leans heavily on the French, whose approach to food is imaginative and uninhibited, but regards the South Chinese as the least prejudiced and most inventive. Recipes are cross-indexed by main ingredient and region.

Encyclopedic as it is, the book has curious omissions. The crows and their Corvidae cousins, which are ubiquitous and delicious, are nowhere mentioned;



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nor is the common rangia *(Rangia cuneata)*, a clam so abundant on the East Coast that it is mined for road surfacing. But there are recipes sufficient to keep the boldest reader experimenting for years. Which is what Schwabe and his family have done.

Each of us must eat for himself, however, and some ideas are hard to swallow. Grilled rat (p. 204) looks good?
—*Hank Burchard*
Staff writer, *Washington Post*

Small Town America: A Narrative History, 1620-The Present
Richard Lingeman
(G. P. Putnam's Sons, $15.95)

"Chicago! Chicago!" Like a clarion call, the final words of Floyd Dell's autobiographical novel *Moon-Calf*, published in 1920, underscored the immense appeal of the big city for countless small-town men and women in the late 19th century. But what of the towns they left behind? That is the subject of Lingeman's absorbing, highly readable *Small Town America.*

The story begins in New England, where the Puritans in their quest for Utopian community established towns smacking of stability—"of peace and order, homogeneity and harmony, conformity and orthodoxy"—whose churches and meeting halls remain "stored like a faded postcard in the attic of American memory." As the country moved westward, the New England pattern would change to meet diverse needs and conditions. New England towns remained the essential model, however. Town life encouraged conformity, suspicion of strangers and new ideas, and a neighborliness that was counterbalanced by a tendency to pry into the private lives of neighbors.

Perhaps inevitably, considering the abundance of land, speculation became a major factor in the settlement of the Ohio Territory, and then broke wide open when the pioneers entered the Western Reserve in the early 1800s. In Illinois, Michigan and elsewhere, town jobbers advertised opportunities to buy land in "paper towns," which were always on the verge of becoming hubs of commerce because of vaguely forthcoming railroads or steamboat landings but often stood "in the midst of a flat, empty nowhere. . . ." Still, many of these towns were legitimate and succeeded.

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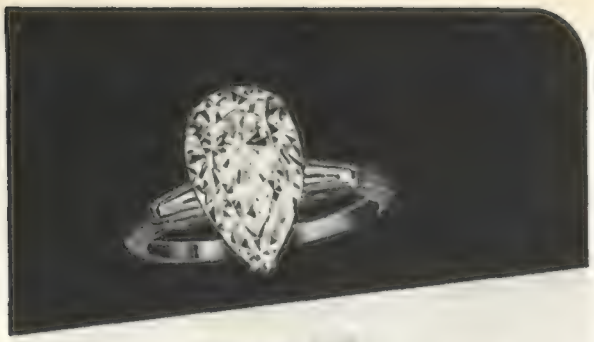

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promise of trade, government and a modicum of social life to alleviate the weariness of often harrowing wilderness lives. As elsewhere in his narrative, Lingeman offers abundant details and anecdotes illustrating the daily lives of such townsmen (town often being just a cluster of cabins). They were simple, hardworking people, their only release the spectacle of politics, trials and camp meetings.

As Lingeman makes clear, most of these pioneer towns grew slowly and haphazardly, always subject to economic currents and the whims of absentee landlords. The coming of canals and railroads in the mid-1800s fostered trade with eastern markets; but few towns developed into centers like Cleveland and Cincinnati.

Lingeman follows the cross-continent trek, giving us vivid portraits of the cow towns and railroad-junction towns of the Great Plains, the adobe towns of the Southwest, and the ugly, impermanent mining towns like Mad Mule Gulch and You Bet, among other types.

In a superb section that illuminates many Americans' "love-hate relationship" with small towns, Lingeman offers a discerning analysis of the literature of the small town from 1890 to the early 1900s—the period when it reached its "apotheosis" as an American Mecca. Quoting extensively from novels, autobiographies and other writings, he shows how authors like Sherwood Anderson, Floyd Dell and Edgar Lee Masters criticized the cultural aridity of towns, and then in the case of Thornton Wilder and others, looked back nostalgically at the same towns in the fevered 1930s.

Like many of these writers, Lingeman concludes that the small town has been "good, generous, kind, helpful in trouble, cradle to grave." It also has been "materialistic, insular, suspicious, set in its ways, canny, backbiting, smothering." Certainly it has been a remarkable, enduring part of American life, and its story has been wonderfully recounted here.

—Joseph Barbato
Writer and Editor

The Battle for Gaul
Julius Caesar
A new translation by Anne and Peter Wiseman, with illustrations selected by Barry Cunliffe (David R. Godine, $15.95)

"Is anything exciting happening now?" Phineas taunted his roommate at Devon

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School as he struggled with a muddied translation of a passage from *De Bello Gallico*. "A surprise attack," Gene replied, but Caesar "wins it in the end." He always did, of course, but Phineas, we are told by novelist John Knowles in *A Separate Peace*, carried such a grudge against Caesar—"the bane and bore of schoolboys . . . more a tyrant at Devon than ever he had been in Rome"—that he simply refused to believe the noblest Roman of them all had ever really lived.

Even Phineas' skepticism might have been undermined by Anne and Peter Wiseman's fine new translation of the seven books of Caesar's *Commentaries* on the Gallic wars (together with the eighth book added by Hirtius). A sound, scholarly job, packaged in a handsomely bound, attractively printed volume under the title *The Battle for Gaul*, it aims at making Caesar more accessible to readers who may have confronted him for the first—and last—time in Latin II and never quite recovered. But its appeal should extend to seasoned classicists who will approve of a translation that succeeds in reproducing in English the vigorous cadences characteristic of Caesar's straightforward Latin style. Dozens of illustrations of battle sites, Roman and Celtic weapons and artifacts, and reconstructions selected by Oxford archaeologist Barry Cunliffe, complement the text, as do excellent maps detailing each of Caesar's campaigns in Gaul.

Not every reader will agree that all of the concessions made to accessibility were necessary or wise. Caesar, for instance, appears in the first person, more natural surely in English but a device that as a matter of taste and literary convention no classical author would have used. The effect is to lend Caesar greater immediacy but also to make him more intimidating—not the sort of image I think he wanted to project in the *Commentaries*.

Likewise, the modern equivalents of place-names are substituted, where they have been judged to be more familiar, for those that Caesar knew. Perhaps Lutetia can become Paris without the reader sensing the jarring assault of an anachronism, but then what are we to think of Caesar's legionnaires trudging through Normandy?

Whatever may be said for making him more accessible today, Caesar seems never to have lacked for readers in the past. Nor has he ever ceased to be topical, not

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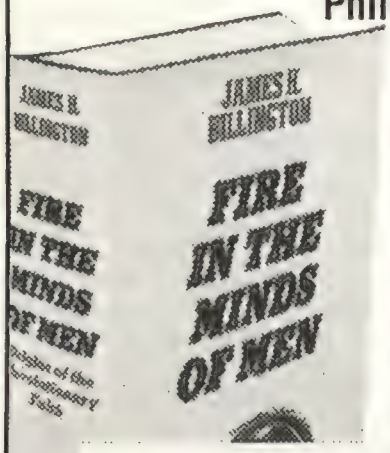

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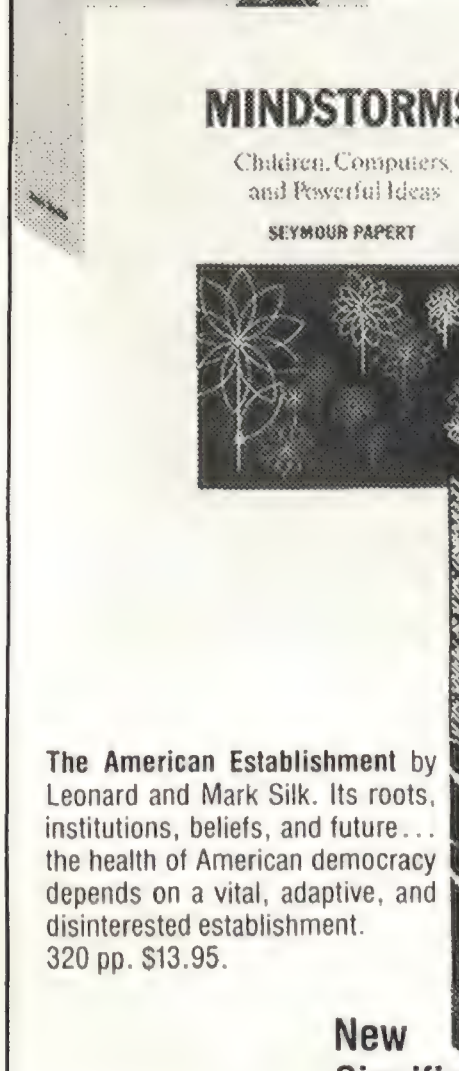

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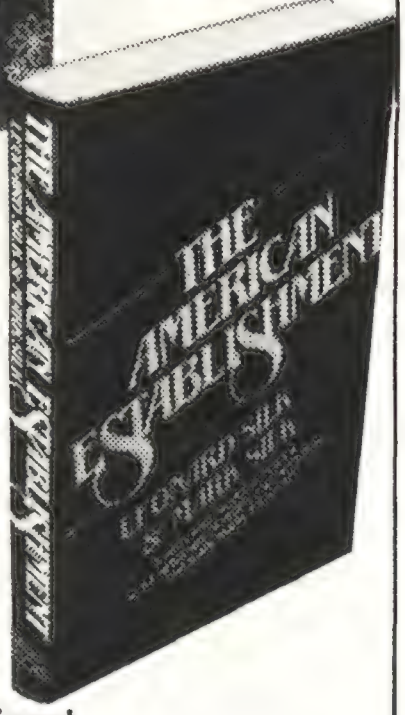

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even in 1980. We only need turn to his account of how the treacherous Veneti made hostages of Roman envoys, a "category of men," Caesar wrote, that "has always been sacred and inviolable to all peoples." Caesar coolly ordered the execution of the tribe's elders, and sold the rest into slavery.

Caesar's *Commentaries* has been read as a personal memoir, a military textbook, and as a public-relations exercise used by a canny politician to build a base of support within Rome's political elite. With an eye on posterity, Caesar also intended that this collection of annual reports composed in the winter recesses between campaigning seasons should serve as a source book for historians. But his contemporaries were discouraged from further research, frankly admitting that Caesar had already exhausted the subject. Historians in succeeding generations did little more than elaborate on what he had written about himself. What we know about the Gallic wars we have learned from Caesar and from modern archaeology—its findings tend to confirm the technical details of his history. Caesar has continued to look good even on his occasional bad days.

The story of the eight years of war that put all Gaul under the Roman eagle and of Caesar's subsequent rise to absolute power in Rome is well enough known. What is perhaps not sufficiently appreciated is Caesar's lofty stature in his own day as a literary figure. His unadorned style was not that of a plain-spoken soldier but rather the product of a deliberate technique that stressed brevity and spareness. Caesar's contemporaries commented on the elegance of his language, but Quintillian observed a century later that Caesar wrote in the same spirit that he fought—with "force, power, liveliness, and keenness of intellect"—a compliment Caesar would have appreciated above any other.

Caesar's literary gifts notwithstanding, high school sophomores, deeply involved with his syntax, have usually come down squarely on the side of the Gauls. Why must the Roman always win over the Gaul who stood forth bright and brave to die for values that they can understand much better than Caesar's lonely ambition? Even Caesar had recognized that "all people naturally want freedom and hate to be enslaved."

Although the barbarians invariably had the advantage of numbers in battle, Caesar's disciplined soldiers slaughtered the Gauls, by his own account, at a genocidal rate. The Gauls made fun of the Romans' small stature and wondered if Caesar were not favored by divine assistance. Caesar credited his soldiers' guts (called "valor") and his own generalship for Roman success—along with good luck, the lack of which at any time could have made all the difference.

The mercurial Gauls had shown little capacity for state building. Still, we can speculate idly on what they might have done with their freedom, what unique civilization they might have produced, had Caesar not come and implanted Latin civilization up to the edge of the dark Teutonic forest. But once conquered, Gaul was quickly integrated into a world empire bound together by law, language and the Roman road. Towns grew up, trade flourished, order prevailed—and Rome built triumphal arches to remind the Gauls that in the end Caesar always won.

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Identical twins (p. 48)

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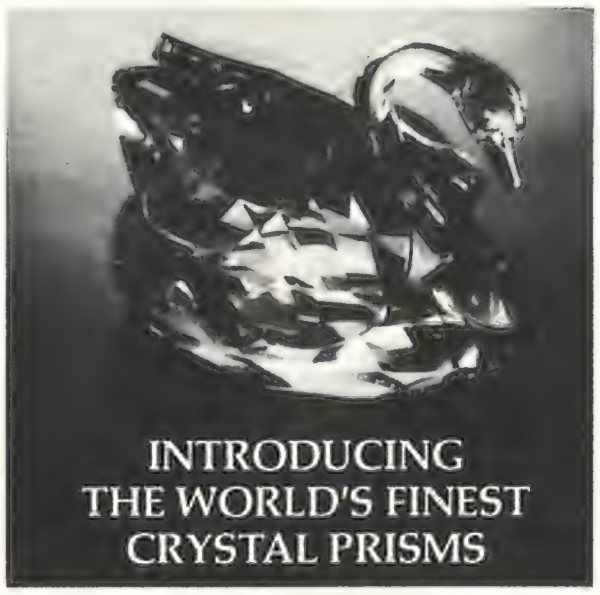

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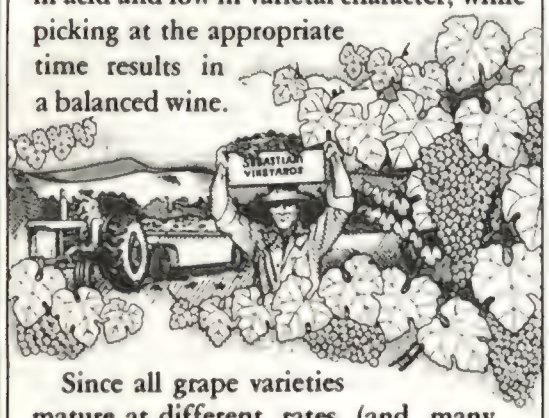

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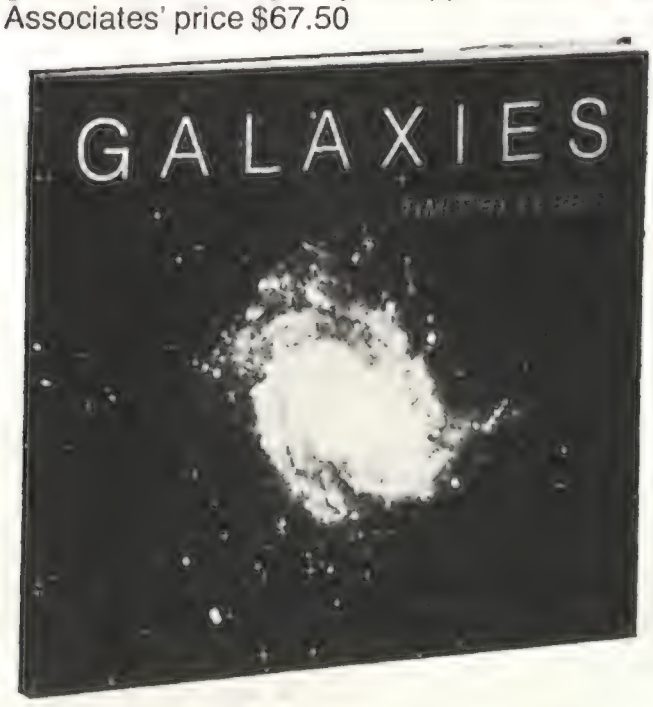

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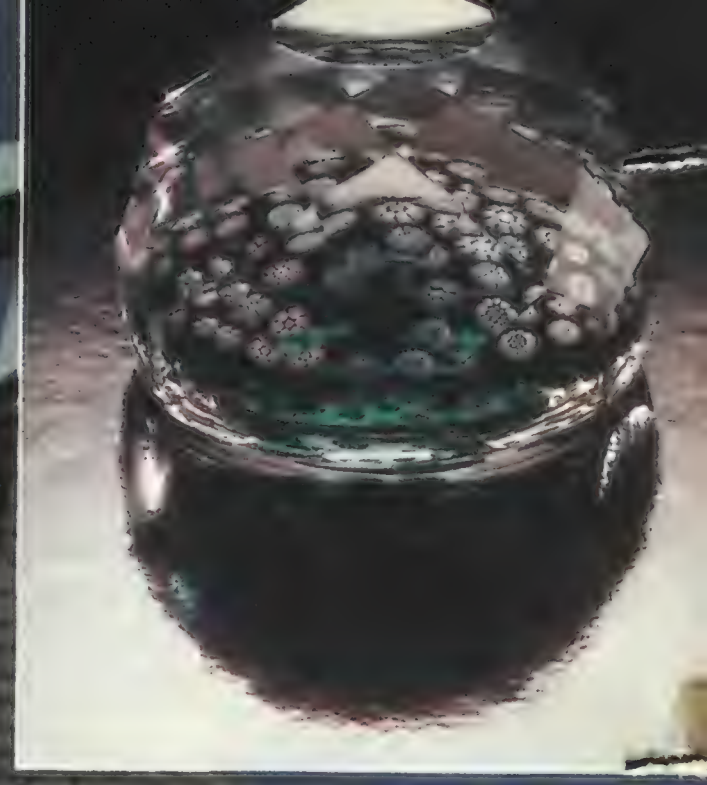

MILLEFIORI, or "thousand flowers," is a paperweight design first done in France, embodying medieval Venetian techniques. Our brilliant green lead crystal millefiori weight by Whitefriars is part of a limited edition of 200. 2¾" diameter. 7612 $200.00 (Members $180.00) (s/h 4.00).

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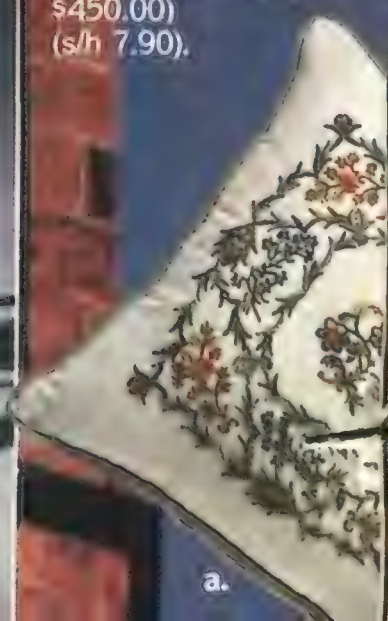

a.

ELICACY AND SUBTLETY combine in this exquisite reproduction of "The Isle of Shoals Garden" by Childe Hassam, noted painter of impressionist interiors and landscapes. The original 1892 watercolor is in the National Collection of Fine Arts. This 13½" by 20" print is true to the color, value, and tone of the original. It comes matted under an acrylic pane in a handsome golden wood frame ready to be hung. 20" by 26" framed. 5500 $85.00 (Members $76.50) (s/h 5.10).

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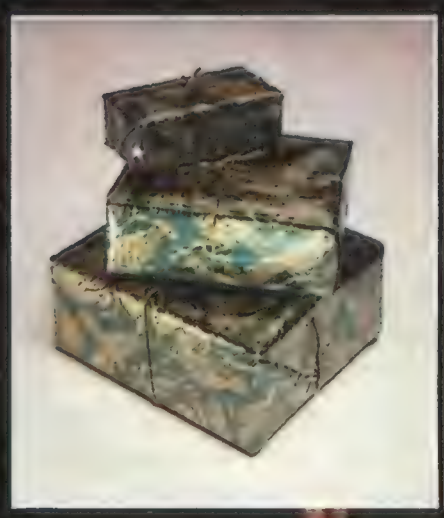

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b.

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These tours offer specialized guidance and expertise generally unavailable to persons traveling on their own:

Smithsonian Sampler Weekend—October 24-26: Curators and staff conduct behind-the-scenes tours of specially selected museums.

The Florida Keys: A Tropical Wilderness—November 2-9: An active program offers snorkeling and field trips to explore Big Pine Key and colorful coral reefs.

Philadelphia—November 5-9: This historically rich city embodies origins of our nation; visit homes in Society Hill, Rittenhouse Square and Fairmont Park.

Sapelo Island—November 9-15: Camp on unblemished beaches while studying the marine ecology, Indian ruins and history of this Georgia Barrier Island.

National Air & Space Museum—November 14-16: In-depth exploration of this popular museum and its restoration, preservation and storage facilities.

Christmas at the Smithsonian—December 5-7: Ninth annual tree-trimming party and special tours of museums.

Virgin Islands Adventure—January 12-21 or January 21-30: Chartered sailboats provide bases for exploring the Caribbean and spectacular coral reefs.

Baja Whale Watch—February 6-14: Sportfishing boat serves as base for observing gray whales and marine life; hikes and lectures focus on natural history of the Baja islands.

Yellowstone in Snow—February 20-March 1: Cross-country ski in Jackson, Wyoming, and Yellowstone National Park to discover the splendors of nature.

Tetons Winter Ecology—March 31-April 8: In cooperation with the Grand Teton Environmental Center, study the delicate balance of nature in winter. Includes cross-country skiing, day and evening programs.

Washington "Anytime" Weekend: Choose any weekend to visit your choice of Smithsonian museums, spend two nights at Loew's L'Enfant Plaza Hotel or Hyatt Regency Washington, each close to the Mall, and see other sights in the city by Tourmobile. Reservations and payments at least ten days prior to arrival.

Foreign Study Tours

These tours range in size from small group experiences to charter adventures and vary in price from low cost to deluxe, depending on the type of travel, destination visited and length of trip:

India Wildlife Safari—November 16-December 9: Observe the magnificent animal life of the subcontinent. Travel to wildlife sanctuaries from Central India to Assam; also Nepal's famous Tiger Tops.

Antarctica—December 31, 1980-January 20, 1981: Cruise aboard the *World Discoverer* from Punta Arenas, Chile, to the Falkland Islands, then to Antarctica.

Baroque Winter: Vienna, Salzburg, Munich—January 4-18: The splendors of Central Europe in the new year with walking tours, museum lectures, opera and concerts in old Vienna, Mozart's Salzburg, and the Bavarian capital. A special Smithsonian Viennese Ball is included.

Mayan Mexico: The Yucatán Peninsula—January 8-20 or February 3-15: The extraordinary ruins of the Yucatán in the company of an archaeologist—Uxmal, Palenque, Labná, Sayil, Kohunlich, Coba, Tulum and Chichén-Itzá.

Guatemala—January 21-February 1 or February 18-March 1: Visit Tikal, Copán, Quirigua and El Baul. In addition, see the mountain lake of Atitlán and the markets of Chichicastenango and Santiago—under the guidance of an archaeologist.

Kenya—February 5-22: Incomparable wildlife is observed in old safari tradition. Seminars in Nairobi, and in the field—Masai Mara, Samburu, Kilaguni.

Micronesia—An Adventure Tour—February 9-28: Unique opportunity to visit the remote, breathtakingly lovely and unspoiled islands of the North Pacific Ocean—Majuro, Kwajalein, Ponape, Truk, Saipan, Palau and Guam. (Originates and ends in Honolulu.)

A Hike in New Zealand—February 13-28: Take the "finest walk in the world" along the Milford Track from Lake Te Anau to Milford Sound; also included, Mt. Cook National Park, Queenstown, Erewhon Park and Christchurch.

New Zealand—February 18-March 6: Tour includes Mt. Cook, Te Anau and Milford Sound, Auckland, Rotorua, Wellington, Christchurch; talks on natural history, Maori heritage, and a home visit.

Zapotec and Mayan Mexico—March 4-16 or March 18-30: Begin in Oaxaca, one of Mexico's most enchanting cities, with visits to the Zapotec sites of Monte Albán and Mitla; then across the Isthmus of Tehuantepec to the colonial town of San Cristobal de las Casas. Finally, enter the Mayan world at Palenque before crossing the plains of Chiapas to Campeche and Uxmal.

Morocco—March 7-22: The medinas and souks of Morocco from Rabat, Meknès, Fez and Marrakesh across the Atlas Mountains to the Sahara. Encompassing the stark Roman ruins of Volubilis, the markets with their textiles and the modern Morocco of Casablanca.

Portugal—May 5-19 or October 6-20: After a four-day Lisbon program, choose between a travel seminar to the Alto Alentejo featuring Evora and the fortified hill towns of Estremoz and Marvão or travel to old Lusitania featuring Porto, Coimbra and Veisu.

London—May 11-25: The museums and theaters of London plus special walking tours, seminars and excursions, with time to explore London on your own. Select a five-day travel seminar into the English countryside.

Malaysia, Borneo and Singapore—May 25-June 12: Kuala Lumpur, Penang and Malacca—plus a choice of travel to the seldom-visited East coast; the remote National Park; or an exciting excursion to Borneo reminiscent of the White Rajah.

Odyssey of Flight—May 21-June 8: Visit the great aeronautical museums of England and France in the company of curators from the National Air and Space Museum. Special visits to the Paris Air Show, the Musée de l'Air, Britain's Shuttleworth Collection and much more.

People's Republic of China: 13 tours from April through October with five different itineraries.

Coming in November: **Alpine Countryside, Wales, Finland.**

Write National Associates, A&I 1278, Smithsonian Institution, Washington, D.C. 20560 for specific tour/seminar brochures or call (202)

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Selected Studies Seminars

Now is the time to enjoy a popular and growing program at the Smithsonian which combines excellent speakers with small, specially arranged tours "behind-the-scenes." Choose from:

Historic House Preservation—Oct. 19-24. Experts advise on how to work with architects, contractors and other professionals; explain mistakes to avoid and how to save money; and lead tours of lovely Georgetown, Old Town Alexandria, as well as famous country estates.

Aircraft Restoration: How To—Oct. 26-30: Internationally known craftsmen who have restored the famous masterpieces of aviation in the National Air and Space Museum offer workshops at the Paul E. Garber Facility (formerly known as Silver Hill) on the many various techniques used.

Genealogical Research—Nov. 16-21: Taught by Milton Rubicam, the "dean of American Genealogy," Marilyn Duncan and other leading authorities, participants learn how to conduct research in major genealogical repositories such as the National Archives, Library of Congress and the DAR Library.

The Splendor of Byzantium—Feb. 15-20: The magnificent arts of Constantinople and the vast Byzantine Empire, described in illustrated lectures. Also, special tours of the exquisite collections at Dumbarton Oaks (Harvard University's handsome Byzantine research center) and the Walters Art Gallery in Baltimore, led by outstanding experts in Byzantine art, architecture and culture.

Model Airplanes: Then and Now—Feb. 22-27: Foremost talents in every aspect of aeromodeling meet for the first time at the National Air and Space Museum, to discuss the whole panorama of aeromodeling with an abundance of film clips, slides and actual models.

Coming in the Spring:

Connoisseurship of American Antique Furniture, 1650-1840—Mar. 22-27
American Painting—Mar. 22-27
World War II Aviation—Mar. 29-Apr. 3
The Navy: From the Age of Sail to Nuclear Power—Apr. 26-May 1
Historic Horticulture—May 3-8

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By John Sherwood

Foot-in-mouth disease must be contagious

Burning the hatchet at both ends while cooling his thumb. . . .

Eleven months ago, an article of mine appeared on this page under the title "Malapropisms, oft apt even if inappropriate." The mail has never stopped; it turns out that there must be many people who, like me, cherish favorite malapropisms, spoonerisms or Archie Bunkerisms—those mangled phrases that often contain a crazy, twisted logic all their own. I want to share a few more of these with you.

One correspondent confided that her husband recently told her, in anger, to "ship up or shape out." But he quickly forgave, allowing that it was easier to "burn the hatchet at both ends." He gets TV programs mixed up, too. *Big Valley* comes out *Deep Canyon*; *Medical Center* is *Animal Shelter*; *60 Minutes* is *60/60*. (He does like *20/20*, too.)

Another writer told of a spouse who has declared "Oh, well, it's 12 of one and a half-dozen of another"; prefers deli shopping at the "Big Pig" (it's the "Little Pig"); refers to Greyhound as Trailhound; complains about a friend's "Voltaire" (it's volatile) personality; and loves to receive "Happy St. Valentine Time's Day" cards.

A man from Portal, Arizona, wrote about a warning that he received as a youth: "A needle in the bush gathers no moss." To which he added, "Alas, I took no heed, and now, having buttered my bread, must lie in it."

Former Army Major Robert R. Spooner of Colorado Springs once introduced himself at a military meeting with a classic spoonerism all his own: "OK, fellows, this is Major Speaner spooking." His inner ear must have liked it, for he repeated it.

A North Carolina woman wrote of a legal secretary who said it was "like pulling hens' teeth" to get her lawyer to file a brief at the courthouse. And her own fumbled attempt at trying to put off an ardent suitor went like this: "I'm sorry—just think of us as two ships that go bump in the night."

A Carson, California, reader offered the advice he got from an impatient teacher on a geology field trip: "You wouldn't be happy if they drove a silver stake through your ear ball."

From Hyannis, Massachusetts, came these secretarial gems from an employer, who adds, "bless her mental frame of mind." Amazed at a surprising occurrence, she exclaimed: "You could have tickled me with a feather." And in cautioning the boss not to tease a fellow worker, she advised: "It's best not to rib his leg."

An Andover, Massachusetts, reader remembered his father, who noted that one of his relatives would be shocked by the goings-on of today: "Why, if he were alive, he'd turn over in his grave."

But one of the best of the letters came from an elderly man in Little Compton, Rhode Island, who wishes to remain anonymous. For more than 40 years of married life he has kept a book of his wife's "bloopers." Here goes:

"You can't expect Bruce [their dog] to sit around all day cooling his thumbs."

[And after the same dog messed on the rug] "After all, he's only human."

"I'd give my eye shirt. . . ."

"He's got a bear by the horns."

"I'm as nervous as a wreck."

"I waited on him hand and glove."

"It never rains but it shines."

"He shook like an aspirin leaf."

"He reads every magazine from foot to cover."

"He slammed the door at the top of its lungs."

"The papers were waylaid somewhere."

"He's slight of hearing."

"Don't carry a grudge on your shoulders."

"He roared like a bullfinch."

"Before you can count 'Jack Robinson.' "

"Hasn't that hole in your trousers healed yet?"

"My granddaughter danced around me like a ten-foot pole."

"I wouldn't buy that house if it was given to me."

[At the bridge table] "That bid certainly took the steam out of my sails."

Well, that gives an idea of how some of us talk.

Personally, I'm delighted by it. You just never know when you're going to be hit. Like only recently when my wife and I went out to dinner at a place called the Black Pearl, which we reached by sailing into Baltimore's inner harbor. I told her to go inside and get a table while I parked the boat.

When I got inside she was standing in an outer room with about six other people. She wanted very much to tell me that all the tables were full. Instead, she asked: "When do you think we'll get into Pearl Harbor?"

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